NATURE MAGAZINE

JUNE 1928 VOL. 11 NO. 6

35 CENTS

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Organized to Stimulate Public Interest in Every Phase of Nature and the Out-of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

The American Nature Association seeks to find for Nature Study an essential place in every School and in every American Home. It is working for Forest and Wild Life Protection along sane, economic lines. It believes that clean, healthful Out-of-Door Recreation is the key to Good Citizenship

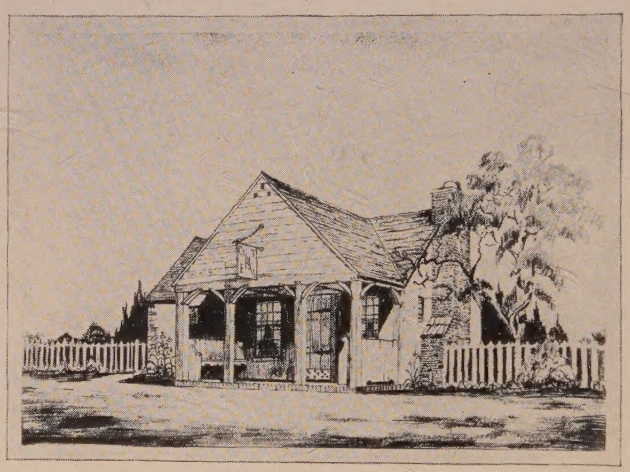
As announced in the May issue, the October number of Nature Magazine will be a California number, replete with beautiful illustrations and filled with outstanding articles on that State from the wild life viewpoint. Our president, Mr. Arthur Newton Pack, has recently returned from California where he was busy working on this issue with the result that we are able to assure our readers that the California Number is going to be a remarkable one. Members wishing extra copies are urged to communicate with this office in order that these copies may be provided for in running the October issue.

* * *

Considerable interest seems to have been aroused by our monthly Photographic Contest and the number of entries continues to be large. We hope that our photographing readers will not overlook the special Garden and Outdoor Good Manners contests for which special pictures can be taken. Reread the announcement in the January issue or send for an announcement of the contest.

* * *

Speaking of Outdoor Good Manners, we are reproducing on this page a winning design in the contest for Better Wayside Refreshment-Stands. We hope that the members of the American Nature Association will spread the thought of improving these stands by specially patronizing those who have good taste and Outdoor Good Manners in establishing these roadside facilities.



Design by William E. Frenaye, Jr., of an artistic refreshment-stand which won first prize in the Wayside Refreshment-Stand Competition initiated by Mrs. John D. Rockefeller, Jr., through the Art Center of New York and the American Civic Association of Washington, D. C.

* * *

So popular was the Cardinal Cover of our December issue in its reprinted form for framing that we have almost exhausted the limited number of copies of the special printing made in response to requests from members. This fact indicates that not infrequently members would like to have copies of the beautiful paintings by our artists in separate form specially printed for framing. The Editors are considering working out some such program and hope that members will not hesitate to express their opinion of such a program, and also to mention those pictures which they think would be of most interest to them and to others.

* * *

The printing of a limited number of Outdoor Good Manners cartoons suitable for posting has met with enthusiastic response and this printing has been used up.

* * *

Bulletins Numbers 35, 36 and 37 on Care and Selection of Garden Roses; Knowing Hardwood Trees by Their Flowers; and Keeping the Weeds from the Lawn are now available to members and will be sent for a two-cent stamp.

Nature Magazine is published monthly by the American Nature Association
Entered as second-class matter May 31, 1927, at the post office at Washington, D. C. Additional entry at Greenwich, Conn.

Publication and Editorial Offices, 1214 16th Street, N. W., Washington, D. C.
Chicago Advertising Office, Mather-Tower Bldg.

Additional Offices of Publication, Greenwich, Conn.
New York Advertising Office, 171 Madison Avenue.

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That's what you get in the

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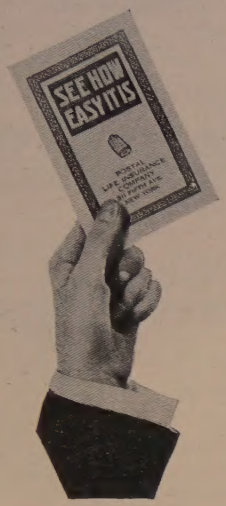

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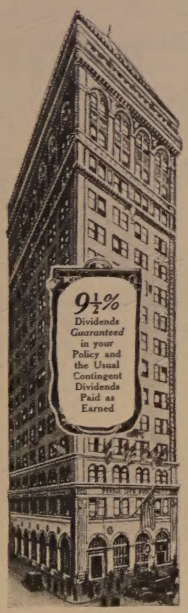

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On claims by death	12,942,427
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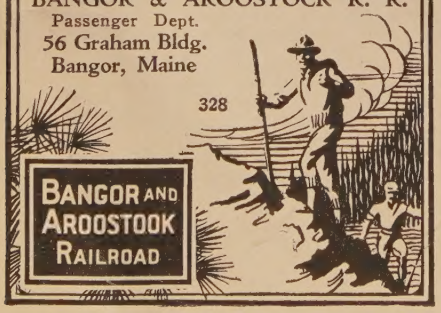

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Travel DEPARTMENT

Readers of this column are urged to write to the Travel Editor for any information desired relative to travel, whether it is for short distances or long distances. To every inquirer will be sent, by return mail, some definite information and this will be followed by special literature regarding the places about which they desire information. This department is designed to be of direct personal service to the readers of this magazine.

Two events on the European calendar this season are of great interest to most Americans. The popular Olympic Games are drawing even more than the usual number of tourists to Holland. These international matches are to be held at Amsterdam from July 22nd to August 12th. Several steamship companies are planning special Olympic Tours for those crossing particularly to attend the games.

Any one planning to be in England should arrange to attend the Shakespeare Festival. This will be held at Stratford-on-Avon from July 2nd until September 8th, with daily presentations of Shakespearean plays.

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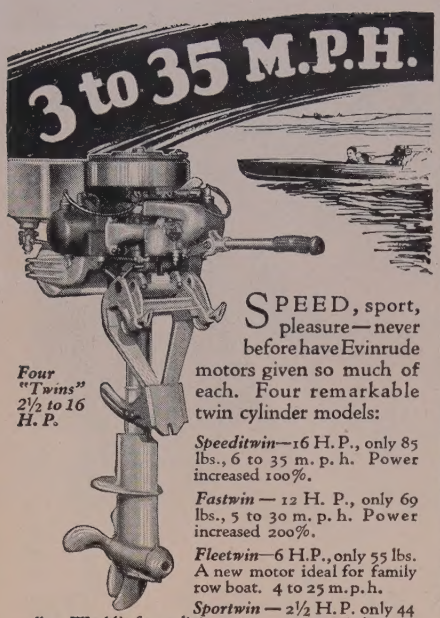

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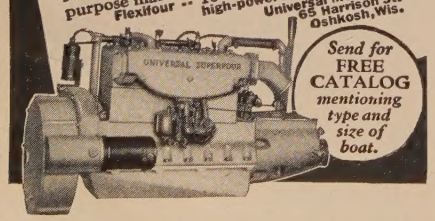

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"Old Town Canoes"

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Among the literature we have received relative to Student and Third Class Tours to Europe, are some very attractive booklets describing Collegiate Tours, particularly on Canadian Pacific boats. These tours vary in length and in price according to the extent of the trip, but are all at unusually low rates. The two most popular are one to England and the northern section of the Continent, and the other to France, Italy and Switzerland.

As regards European travel, further literature has been issued concerning motor trips and airplane transportation. The motoring with a private party is under the guidance of a courier or guide-chauffeur. You may plan your own itinerary with the advice of the company from whom you obtain the car. The air service between the principal cities is of great convenience in covering long distances, and the regular summer schedule of flights is now in effect.

"Top o' the World" Tours is the intriguing name given their trips to Alaska by the Pacific Steamship Company. The tours are conducted as round-trip excursions from Seattle to various sections of Alaska. The amount of time required for the trips depends upon the number of stop-overs and side-trips you plan. The prices are reasonable and include your berth and meals for the entire steamer trip.

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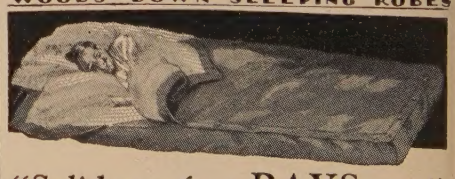

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FOR MEN who want to become independent in the NEXT TEN YEARS

IN the spring of 1938 two men will be sitting in a down-town restaurant.

"I wonder what's going to happen next year," one of them will say. "Business is fine now—but the next few years are going to be hard ones, and we may as well face the facts."

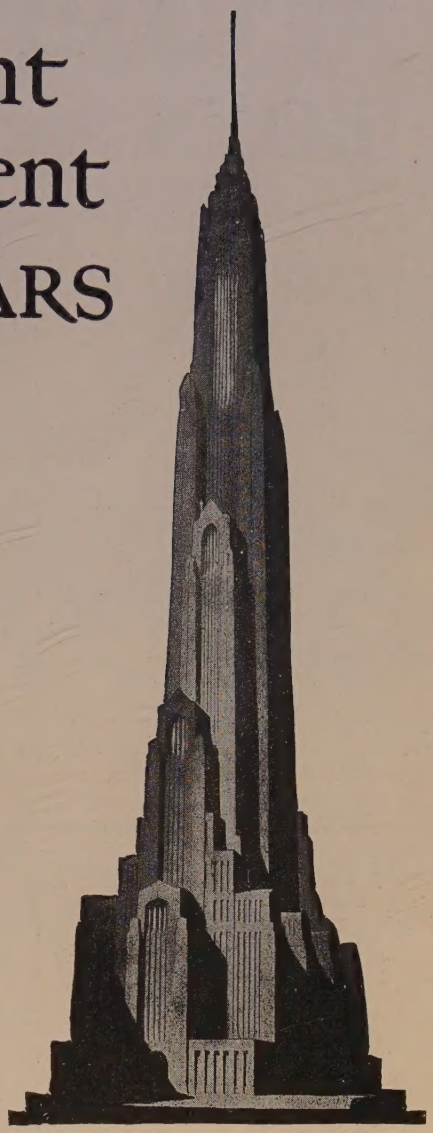
The man across the table will laugh.

"That's just what they said back in 1928," he will answer. "Remember? People were looking ahead apprehensively—and see what happened! Since then there has been the greatest growth in our history—more business done, more fortunes made, than ever before. They've certainly been good years for *me* . . ."

He will lean back in his chair with the easy confidence and poise that are the hallmark of real prosperity.

The older man will sit quiet a moment and then in a tone of infinite pathos:

"I wish I had those ten years back," he will say.



"Since then there has been the greatest growth in our history—more business done, more fortunes made, than ever before."

TODAY the interview quoted above is purely imaginary. But be assured of this—it will come true. Right now, at this very hour, business men are dividing themselves into two groups, represented by the two individuals whose words are quoted. A few years from now there will be ten thousand such luncheons and one of the men will say:

"I have got what I wanted."

And the other will answer:

"I wish I had those years back."

In which class are you putting yourself? The real difference between the two classes is this—one class of men hope vaguely to be independent *sometime;* the other class have convinced themselves that they can do it within the next few years. Do you believe this? Do you care enough about independence to give us a chance to prove it? Will you invest one single evening in reading a book that has put 300,000 men on the road to more rapid progress?

This book costs you nothing—and for a good reason. It is worth only what you make it worth. It explains how for more than eighteen years it has been the privilege of the Alexander Hamilton Institute to help men shorten the path to success; to increase their earning power; to make them masters of the larger opportunities in business.

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BOYS 9-18

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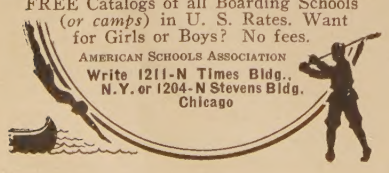

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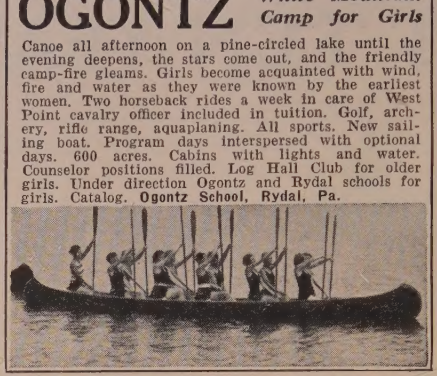

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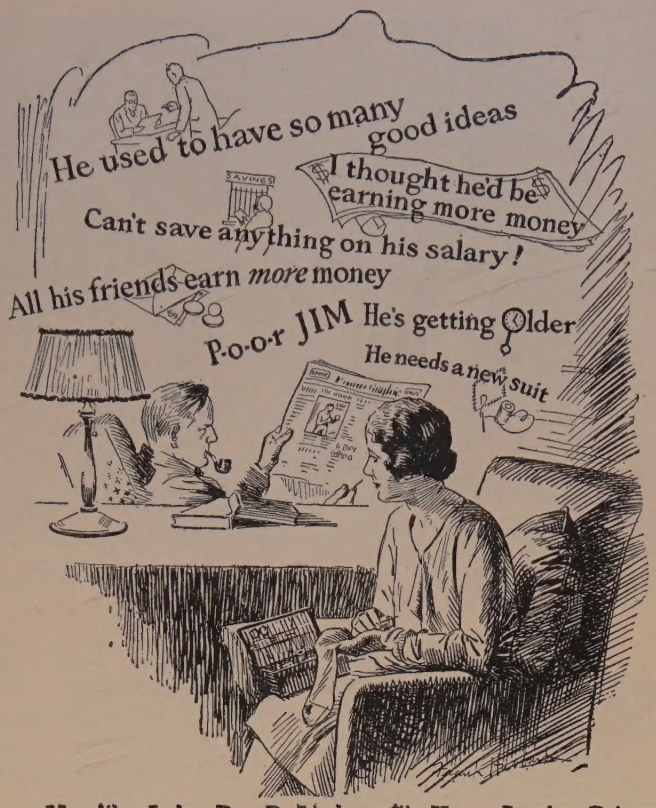
He used to have so many good ideas
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P-o-o-r JIM He's getting Older
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PUBLISHED BY

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Nature Magazine, past and present, is indexed in the Reader's Guide in your library.

NATURE MAGAZINE is published monthly by the American Nature Association
Entered as second-class matter May 31, 1927, at the post office at Washington, D. C. Additional entry at Greenwich, Conn.

Subscribing Membership Blank will be found in the back pages of the magazine.

Publication and Editorial Office, 1214 16th Street, N. W., Washington, D. C. Additional Offices of Publication, Greenwich, Conn.

ADVERTISING OFFICES

New York—171 Madison Ave.
Chicago—Mather Tower Bldg.
San Francisco—Hunter-Dulin Bldg.
Los Angeles—Lincoln Bldg.
Seattle—Henry Bldg.
Atlanta—Grant Bldg.

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Short-tailed Shrew—*Blarina brevicauda*

White-footed Mouse—*Peromyscus leucopus*

Mole—*Scalopus aquaticus*

Meadow Mouse—*Microtus pennsylvanicus*

Pocket Gopher—*Geomys bursarius*

Brown Lemming—*Lemmus trimucronatus*

"WEE BEASTIES"

A Group of Tiny Wild Folk

by Carra E. Horsfall

Color Plates by R. Bruce Horsfall

MUCH undeserved blame descends upon the mole in our garden. Destructive cutworms, grubs and earthworms are on his menu and he has few vegetarian tendencies. The death of plants above his burrow is caused by the drying air he lets in. Thus he does unwitting damage as he tunnels for food and home. Usually four to six young, born in March, are ready to burrow their own tunnels by June. Runways near the surface are for hunting. Those at lower levels, for travel, are often community roads. Moles of some species are found commonly in the eastern half of the United States and southern Canada, and the Pacific Coast region.

Gophers are sometimes confused with moles because of the piles of dirt they remove from their underground passages. This is the only point of resemblance, for moles are Insectivores while gophers are Rodents with chisel-like front teeth. Gophers use these to cut grasses, fibrous and woody roots, and tubers to fit into the cheek pouches. This material may be eaten or stored, for gophers are active throughout the year. They have a well developed system of tunnels, storage and living rooms, and spend most of their time underground. In uncultivated level areas they are undoubtedly of value to the land. Here they keep the soil stirred and bring the subsoil to the surface much as earthworms do in smaller quantities, but on steep slopes this soil is washed away and the land impoverished. Where man has planted orchards, gardens or grain fields damage is enormous; rows of young fruit trees are robbed of their roots, gardens of their tubers and bulbs, while grain is destroyed root, stem and fruit. There may be as many as seven young each season. When half grown these begin burrows of their own. Gophers dig with their strong claws and powerful teeth and the dirt is shoved to the surface by the palms of the front feet, head and breast. The long claws may be doubled under in walking. They move forward or backward with equal ease for the sensitive tail acts as a rear guide.

WHITE-FOOT BY MOONLIGHT

Probably the most abundant rodent in the world is the meadow mouse. He is found all over the northern hemisphere from Arctic tundras to the mountains of India and Mexico. Equally at home in grassy meadows or along streams, he is an excellent swimmer and diver. In England a common species is called the water vole. Our American meadow mouse makes elaborate runways, kept smooth and clear of rubbish to facilitate escape. Large underground chambers are filled with dried grass for winter shelter. Hollows nearer the surface are used as nurseries where several litters of four to eleven young are raised. In the autumn these mice come together about the farmers' stacks under which they tunnel and literally eat out their hearts. They invade orchards and gnaw bark from the roots and base of tree trunks. In California they destroy many raisins. In the Arctic they store bulbous grass roots.

The white-footed mouse has cheek pouches in which to carry grain, seeds and nuts. These he stores in hollow logs, stumps or in the ground. The winter home is often a roofed-over bird's nest whence he sallies forth for food. His progeny are numerous as there are several litters each summer. The three to seven young are blind and helpless at birth. Many kinds of white-footed mice are found from tree limit in the north to tropic Yucatan. Dainty track patterns may be seen in the snows of winter, in the dust of the desert at dawn, or even in volcanic ash at an elevation of fifteen thousand feet as on Mt. Orizaba in Mexico, the highest record for a mammal in North America.

Though smaller, the short-tailed shrew is often confused with the mole, perhaps because of the ridges left by its burrowings. Peculiar to North America, it is probably the most numerous mammal in eastern United States. It will be found in wooded lands, cut-over forests, old fields and grass banks along streams, wherever the ground is soft enough to push aside for the erratic runways. Shrews are omnivorous, relishing seeds, nuts and other vegetable matter, earthworms, sowbugs, and even mice larger than themselves. They store snails and insects in their underground rooms for emergencies. Their senses of touch, hearing and smell are highly developed. Since they are wholly beneficial creatures, it is well that there are several litters of four to six, born during the summer and fall.

Lemmings resemble heavy field mice with short tails. Their habitat is the Arctic region, where their winding, many-branched tunnels may be found everywhere, with underground rooms lined with moss and soft grass. They do not hibernate. The young number two to eight; probably there are several litters each season. At times the increase is so great that there is not enough food so they start on a pilgrimage, eating all available vegetation in their path. No obstacle hinders their progress. Their numbers are soon depleted by innumerable enemies, they swim streams and lakes—even the sea does not stop them and many meet their end in its depths, as do those described in tales of the old world.

NATURE CALENDAR

JUNE

by E. Laurence Palmer

JUNE is the month of youth. It is named after the junior branch of Roman legislature to be sure, but it would be just as appropriate were it named in honor of the junior generations of birds, mammals, amphibians and plants that are beginning to make their influence felt in the economics of Nature. Probably at no other time in the year is there a greater abundance of juniors than in this month. Many young birds are still dependent upon their parents for food and protection but many others have begun to assert their independence.

In the far West, the season will be much further advanced. The hills will have dried out and taken on the appearance of straw matting. Water may be in great demand. If 1928 is like 1927, other parts of the country may have more water than they want. The contrast between the parts of the country that are politically wet and those that are politically dry may be most evident this June because of at least one of the party conventions in which the issue will assert itself.

One of the most interesting bits of Nature study for the month may be the study of human nature and the way it is swayed by ballyhoo or by reason. We watch the stilts of the marshy parts of our country put on a song and dance that would do credit to many a political convention and laugh at the absurdity of the bird. At the same time, we see our political representatives swaying crowds by catchy phrases and thunderous voices and are led to make decisions not based upon logic or reason. If it is impossible for you to attend a circus, a political convention or a fair in June go into the fields and woods and watch mother grouse, killdeer, ovenbirds and other birds attempt to lead you in a direction advantageous to their own needs. Of course, all users of ballyhoo do not lead towards worthless goals but the method is primitive though sometimes effective and may be seen demonstrated in June as frequently outside of convention halls as within.

June is the birthday of Rousseau, who way back in the seventeen hundreds developed a type of education based on child nature and the experiences of children with Nature. He said, "Never substitute the sign for the thing; for the sign absorbs the attention of the child and makes him forget the thing represented". June of 1928 will undoubtedly witness the preparation of more summer camps for children than have ever been available before. The teachings of Rousseau could admirably be adapted to the conditions which will exist in these camps if the aim of the camps lies in the field of education rather than of business. To be sure we have learned some things about education not known in Rousseau's time but one does not need to visit many schools at June Commencement time to be convinced that signs are pretty generally substituted for the real things in a goodly number of schools yet,—and there are plenty in which no experiences with real things are provided, particularly in the lower grades. The authorities in these schools may say that they are not yet ready to take up with "this *new* Nature education" forgetting that much of the merit in the teachings of Comenius, Rousseau and Pestalozzi lay in the fact that they taught from natural objects, that this was done between one and three centuries ago and that these leaders have been looked upon as being essentially sound considering the information available at their time. June is, then, a month when many a child substitutes the real things in Nature for the signs which may have been shown him so long in school. This may be returning to the primitive since the substitution of signs for real things is essentially human, but it may help keep our feet on the ground and realize that man is not the actual center of the universe necessarily.

It may suit the whims of some of us in June while lying on our backs looking at the sky to go off on imaginative trips. Kingsley's "Water Babies" may be appropriate reading for the month since Kingsley was born in June and also because of the fact that water life is at a most interesting stage at that time. We will find that real experiences may help our imagination.

A trip into a June forest or swamp will deluge you with experiences with mosquitoes, black flies and other creatures that spent their youth in water. These experiences are much less pleasant than those you can get from turning over a stone in a brook and watching the way the caddis flies have constructed their homes.

If these do not satisfy, then, try a glimpse at the antics of the water-boatmen and backswimmers that seem to be putting on underwater regatta of their own.

THE GREAT AUK

NATURE MAGAZINE

Volume Eleven
No. Six

June, 1928

DAWN OF A DAY OF TRAGEDY

THE LOST LEGIONS

The Tragic Story of the Passing of the Great Auk

by Alexander Sprunt, Jr.

THE GRAY dawn of June 3, 1844 broke sullenly over the heaving waste of the North Atlantic. Ragged, hurrying clouds swept over the lightening sky, and the fitful rays of the early summer sun shone wanly over the rocky promontories of Fire Island, little more than a dot in the turbulent billows which roared and crashed about its iron-ribbed sides. The wind whistled and boomed among the crevices, its ever-changing voice now sinking to a moaning whisper, only to rise suddenly to a strident wail, which echoed eerily over the restless waters, obscured now and again by swiftly rolling wreaths of fog. The day was set for tragedy.

At a glance, this lonely, foam-fringed islet seemed devoid of life. There were those, however, who knew that such was not the case. Lying as one link in a huge chain, it was but one of many islets which reached out into the ocean wastes as outposts of the southwestern coast of Iceland. The dwellers in the vicinity of Cape Reykjanes were fully alive to the opportunities these islands offered in the way of fresh provisions, for they literally swarmed with nesting seafowl, whose eggs and flesh had long sustained generations of the hardy folk who populated Iceland's rugged shores. On this June morning, in the year 1844, a sloop had put out for the island chain, and, anchoring off Fire Island, put a boat ashore for a cargo of meat and feathers.

As the men neared the shore line, the sun, breaking through the fog wreaths, glinted strongly on the snowy breasts of hundreds of murres and razor-billed auks, standing over their eggs, or scrambling about among the rocks, launching out ever and anon in circling flight over the water, and jostling each other in crowded confusion on the rocky ledges. It was an inspiring spectacle, but awoke no admiration in their hearts: they were there for business. Pulling the small boat upon the shingle, they stepped out, and grasping short heavy clubs, advanced toward the ranks of nesting birds. As they neared one segment of the colony, one of the men gave a startled shout, which caused his

comrades to whirl around to see him pointing toward a little hollow among the boulders, flanked by high walls of rock. Following the line of his outstretched arm they saw, against the black wall, two tall, stately, white-breasted, black-backed birds, towering over the lesser fowl like giants in a pygmy village. A cry broke from the pointer. "Garefowl", he shouted. "After them". Rushing forward, they penned in the two birds; one was quickly caught, the life dashed out by a blow of a club; the other, slipping through the cordon, *ran* stiffly toward the cliff, the tiny, useless wings held at right angles to the heavy body. Almost at the edge, beyond which lay safety, it was seized from behind, and the panting pursuer, emitting a yell of triumph, brought his club down upon the dark head. A crushing, sodden sound, the head flew back, the heavy body swayed for an instant, and collapsed to the rocks; a red stream, widening into a pool, gathered about the prostrate form, which shuddered once, twice, and was forever still.

A cloud passed over the face of the sun, a gray wisp of fog closed sullenly about the face of the cliff, and seemed to hover over the bloody form on the ledge, while the whine of the thudding surf rose suddenly in thundering protest, as the life of the last Great Auk floated outward over its lost domain of rocks and ocean.

* * *

The Great Auk has passed into oblivion. More than eight decades have fled since the last bird's life ebbed out on the rocks of Fire Island. The destruction of the species constitutes another black mark against the account of mankind in his treatment of the lesser animals, for man, and man alone, is responsible for the fact that these interesting birds no longer inhabit the earth. The Great Auk was, in one respect at least, different from any other North American bird—it could not fly. And, although once existing in swarming multitudes, this fact, to a large extent, accounted for their disappearance. Again, their habit of returning to the same localities to nest, and the accessibility of these breeding grounds to man, made the end only a matter of time.

TWO TALL, STATELY, BLACK-BACKED BIRDS
Last of their kind, they sat on their rocks as destruction moved upon them

The territory inhabited by these birds was, mainly, the coast and islands of the North Atlantic ocean. General opinion agrees that they did not range to very high latitudes, the center of abundance on the American side being about the coasts of Newfoundland. On the other side of the Atlantic they occurred about Iceland, the Faroe Islands, and as far east as Sweden. Their winter range extended down the Atlantic coast to Virginia and the Carolinas, and, in rare cases, to Florida. The migration, was of course, performed by swimming, and it seems strange that these great distances were covered in this manner. What with storms and other vicissitudes, many of the birds doubtless perished by natural causes, and although following the coast line pretty closely, they were often blown off the course and deep sea voyages resulted.

As might be supposed, Great Auks were masters of the water. The powers of swimming and diving were developed to a high degree of perfection, and as with other members of the Order of diving birds, the small wings, which in the Great Auk were useless for flight, aided them materially in submarine locomotion. They swam very rapidly when alarmed, and it is on record that they have been known to "leave a six-oared boat behind". The food was fish, caught with ease in their native element. Fishermen often took the auks on trot lines set at surprising depths, showing how persistently their prey was pursued.

In the spring of the year the auks turned northwards, and congregated on the rocky islands of the North Atlantic in large colonies to breed. The best known of these nesting grounds was Funk Island, off the coast of Newfoundland. No nest was built, the single egg being laid on a bare shelf of rock. It was rather large, possessed a thick, tough shell, having a dirty-white ground color, scrawled, splotched, and lined with blackish brown markings. Even in early times the taking of the eggs and birds went on at a great rate, but for some time so great were their numbers, that these inroads were not noticed to any great extent. However, far-seeing men warned that such treatment would result in extinction if kept up with such vigor, but were only ridiculed for their views. It is interesting though tragic reading which has come down to us from those times. George Cartwright, writing in 1785, says that the poor inhabitants of the region depended to a great extent upon the birds and eggs for

a living. On clear days, voyages were made to the islands, and there "they made their shallops fast to the shore, lay their gangboards from the gunwales of the boat to the rocks, and then drove as many penguins (auks) on board as she would hold;—several crews of men live there all summer for the sole purpose of killing the birds for their feathers. If a stop is not soon put to that practice, the whole breed will be diminished almost to nothing". Prophetic words.

The Great Auks were often in demand by fishermen as bait after the body had been stripped of feathers. This trade in birds and eggs was carried on with great vigor, and when, at last, it was seen that they were becoming quite rare, there was a rush for skins and eggs by various collectors, which very nearly, if not quite, ended the story. All along the shore of New England, in various spots along the Atlantic seaboard, even as far south as Florida, bones of Great Auks have been found in shell heaps, and bear silent witness to the fact that the destruction went on wherever the birds were found. In appearance, the Great Auk was an imposing bird. Far larger than its cousins, in whose company it bred, the adult bird measured two feet, six inches, and carried itself in an erect, stately poise. The upper parts were black, the sides of the throat and neck brown, with the breast and underparts silvery white. A large white spot was before the eye.

It has been estimated that about seventy eggs are in existence today in various collections, while the mounted specimens and skins number in the neighborhood of eighty. As may be supposed, both skins and eggs are extremely valuable, and command huge sums when they infrequently change hands. The Great Auk was the first of that growing list of birds which are now but memories, and have faded into oblivion since the settling of this country. Happily the laws of the present day do much toward the preservation of our wild life, but even now we must be careful, as others are on the very edge of extinction, and if we are to save them, we must be awake and about it. Shall we not do our part to see that we do not add more black marks to the list?

THIS is the first of a group of articles on extinct birds by Alexander Sprunt, Jr., Curator of Ornithology at the Charleston (S. C.) Museum. Not only are they finely written and of historic value, but they carry a warning of similar destruction of present-day waning species.

Mr. Sprunt is a native of Charleston, graduate of Davidson College, North Carolina, and has been associated with the Charleston Museum since 1922. He has recently devoted much time to the preparation of an exhibit of South Carolina birds, and has carried on successful bird educational work under the Museum auspices.

A TREE FROG CHANGES HIS CLOTHES

by Grace Olive Wiley

Curator, Minnesota Academy of Science Museum

THERE was tragedy in the frog jar,—or was there? In any event something was happening to Prince Charming, our wonderful little tropical tree frog. The wee fellow looked bloated and his skin was dry and wrinkled, although his home was moist. Was he ill? I wet him down, and that helped; also he gobbled a meal worm with relish. Still, he kept slipping from the side of his jar, so out he came again for another worried inspection.

Then it happened. Over his head and eyes appeared a white, transparent coating which looked like a thin layer of paraffin hardening. Then he pushed with his hands over his head towards his mouth, and gasping, opened his mouth and humped his back. The white coating disappeared as though by magic. Where, I could hardly tell, but at the corners of the mouth were tiny, white, transparent ribbons of skin. As I watched the skin started to come off the rear and sides of the little fellow, and, when the frog gasped again, a spot on his side where a transverse stripe was seemed to move forward. Three or four more gasps. Surely the skin was moving forward; sure enough it was disappearing into the corners of his mouth. A gasp was a swallow, and soon this stopped and the skin was gone. Prince Charming settled down on my hand, tucked in his orange-colored hands and feet, closed his brilliant, bulging ruby eyes and was fast asleep. Prince Charming had shed his skin.

"PRINCE CHARMING"

Emerald-green above; creamy-white beneath; sides of yellow; six violet-blue transverse stripes; four clinging orange feet; large ruby-red eyes veiled with eyelids of gold lace when closed,—can one wonder at the name of him?

COLOR MASSES ATTRACTIVELY DISPLAYED
A fascinating arbor framing a delightful vista, with effective incidental gardens

COLOR *in the* GARDEN

A Question that Pays Study with Beauty

by Estelle H. Ries

Photographs by Mattie Edwards Hewitt

THERE is no equivalent for one's own garden, and few possessions have an appeal more tender. Its constant development is a source of endless interest and delight. Flowers require little space, and the smallest dwelling may have its garden. It is simply a matter of adjusting the quantity and variety to the accommodations as many a successful window box can testify. There is often the temptation in a large garden to undertake more than can be personally accomplished. The small garden does not present this difficulty, and by being closer at hand and simpler to care for, offers a more intimate and successful result.

Today, however, we desire that the garden, whatever its size, shall be well planned—none of your haphazard, hit or miss affairs with a daisy here and a weed there. The lovely little faces of the pansies shall not be hidden by the taller and more soldierly row of tulips. Each variety wants to be seen to advantage, and to have neighbors that are congenial as to size and color. Then only do the possibilities of your little plot approach the gracious beauty of a garden; then is fairyland brought to your own doorstep.

While gardens without flowers are not uncommon, the trees and evergreen effects satisfying simple needs, yet of course the ideal garden has the charm of color and scent that only flowers can give. To describe the thrill that comes when the garden is beginning to flower is an impossible feat, but to experience that thrill is by no means impossible and compensates a thousandfold for the effort that is required.

Our well-planned garden must be related to the character of the house of which it is a part. The bungalow or cottage may have a more informal treatment than would be required to supplement a residence more pretentious, but even in the large estate, such formality is only necessary in view of the house itself; there are always opportunities for more natural treatment as well.

It is well to avoid piercing the grass plot with countless little beds of flowers. The lawn will be more easily mowed and kept in order if it is simple. Beds in grass

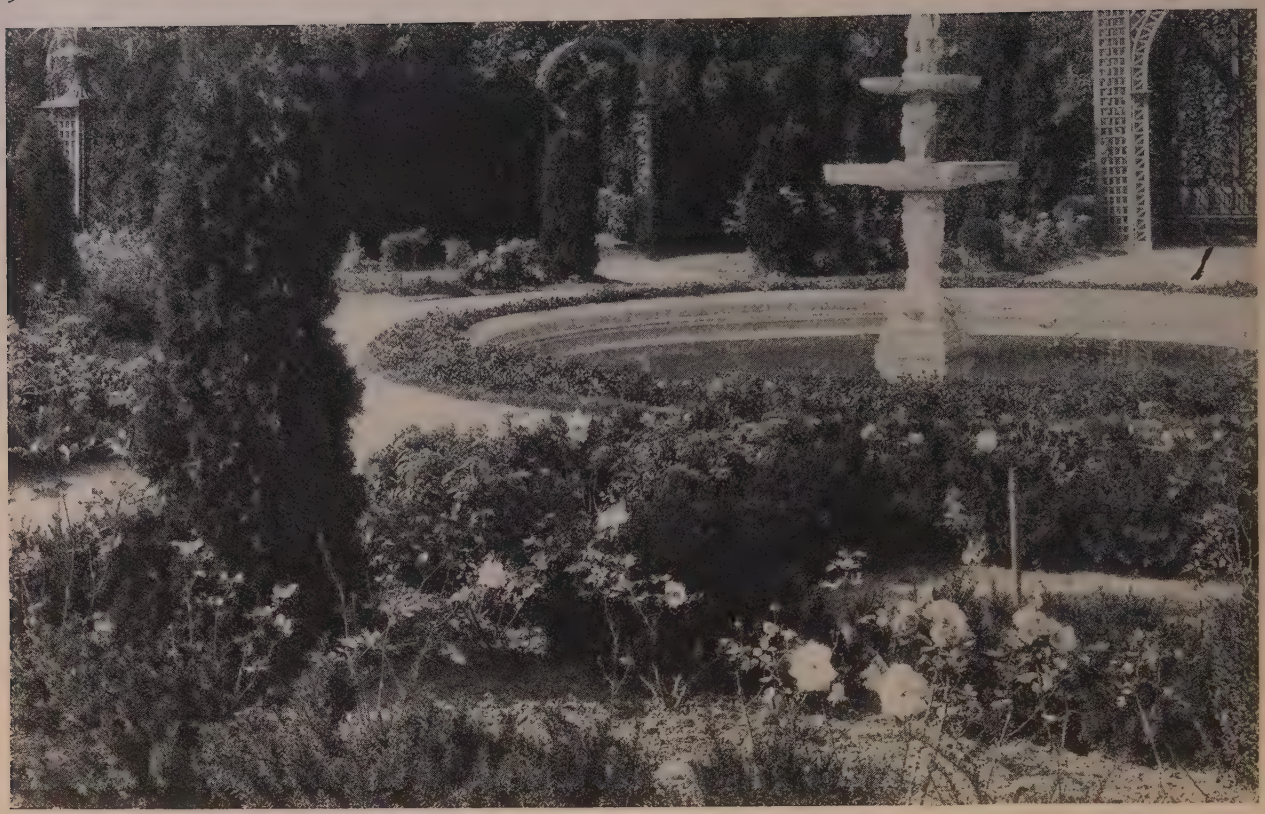
A MORE FORMAL TREATMENT OF THE GARDEN
Flower gardens generally should follow the lines of the walks than be haphazard

are best grouped at one or two points, and the sections of the group should compose as one unit. The outlines of the unit will be pleasing if they are parallel with the lines of the grass plot. An eccentric character in the design of flower beds places the emphasis upon the beds rather than the flowers. Stars, crescents and the like make an artificial result. Their numerous angles are not suitable growing spaces; the flowers are cramped and it is troublesome to keep them in order. Since there are non-flowering months for all flowers, these beds are sometimes brown unsightly objects, and it is therefore a conspicuous advantage to plant the flowers near the house, against a background of vines, or in border beds with shrubs behind them. They will then be better supported in season and less conspicuous out of season.

But of all the various considerations that present themselves in planning a garden, the most conspicuous is color. Before we can analyze the form or detail of a flower, its color is perceived from a distance. The ensemble of colors in a garden is one of its greatest charms. They may follow preconceived color schemes just as interior decorations adhere to a color plan, and there are enough different kinds of flowers in all colors that countless such plans are easily possible of fulfilment. A little more freedom is permissible in the garden in respect of the fact that flowers are living things while most indoor decorations are inanimate. However the garden unquestionably falls short of its best possibilities if its colors are poorly chosen and inharmonious. There is much less chance of a clash in colors when delicately tinted flowers are combined than when bolder ones are found. Thus pale pinks and creams and lavenders and blues are charming together, whereas a combination of deep rose and orange and purple would be irritating.

After deciding upon the desired color, it is easy to refer to a book or seed catalogue to select the representatives of that color and the combinations that will be pleasing with it. But there are other considerations too. If you are new at gardening, you must know that flowering plants are all divided into three groups: annuals which are sown in the spring, come to maturity and bloom that summer, and die in the autumn; biennials which are plants of two years' growth, and being sown in the spring they do not mature that season, but live through the winter, bloom the next summer and then die; finally, perennials, requiring two or three years to mature, but which then go on living and blooming for many years. Thus while beds of annuals like petunias, asters or nasturtiums are brilliant for a time, it is the longlived flowers, the larkspur, phlox, poppies and the like, which thrive through the years.

While annuals are not permanent, they fill a great need for a flower garden effect. In few ways can a few cents be spent so profitably as in the purchase of a package of seeds of annuals. They bloom so quickly that there need never be any bare spots between the shrubs or the perennials or indeed anywhere on the grounds. We may select them for the daintiest or gayest colors, and even the renter of a little house need have no qualms about planting; there is practically nothing



COMBINING SHRUBBERY WITH THE GARDEN

The rich greens provide a fitting and effective background for the planting of flowers

to lose, and untold pleasures made possible with them.

Among the proven annuals that delight the garden and supply the house with cut flowers, the following will, with ordinary care, last not only for three or four weeks, but for the entire summer: ageratum, with blue or white blooms; varicolored asters; yellow calendula; candytuft, which is white, blue and purple; vivid celosia; brilliant clarkia; cosmos, pink and white; blue lobelia; rose, blue or white lupine; golden marigold; petunia, nasturtium, nicotiana, phlox, poppy, sweet alyssum, sweet pea and zinnia.

For bold mass display of color in the rear parts of the ground or along the borders, some of the coarser species are desirable. Good plants for this purpose are sunflower and castor bean for the back rows, zinnias for bright effects in the scarlets and lilacs; African marigolds for brilliant yellows, nicotianas for white. For lower-growing and less coarse masses there may be California poppies for oranges and yellows; sweet sultans for purples, whites and pale yellows; petunias for purples, violets and whites; larkspurs or delphinium for blues and violets; bachelors buttons or cornflowers for blues; calliopsis, coreopsis and calendulas for yellows; gaillardias for red yellows and orange reds. For even less robustness, good mass display may be effected with alyssums and candytuft for white; phloxes for white and various pinks and reds; wallflowers for brown-yellows, and verbenas for various hues. The beds for all annuals should not exceed a width of six feet, else they cannot be conveniently handled either for weeding or picking the flowers. Thus annuals are eminently desirable for the impatient new gardener, while biennials and perennials should be planted in addition for their greater later endurance and their permanence.

The delightful way to plan the flower garden is to plan for continuous bloom. This is indeed an ideal to strive for, and unlike so many other ideals, it is quite attainable. Such a garden has no bare periods, no barren weeks of waiting between the roses and the August blaze of annuals. Working out the planting scheme as to color, succession of bloom and height of the flowers is one of the joys of gardening. The books are so full of information as to the most popular flowers in the three classes which may be grown with general success practically everywhere in this country, that it would be impossible to cite them in this brief article, and unnecessary to do so. By the aid of such charts as most of these books provide, as well as the seed catalogues, you are enabled to make out a list that will include early, midseason and late blooming plants; tall plants for the back of the beds, and low growing ones for a border, all in just the gradations of color that you desire.

From April to frost there is a succession of bloom, beginning with tulips, jonquils and phlox in the early spring, continuing with iris, oriental poppies, peonies, sweet william, lupines, delphinium and madonna lilies in May and June; then hollyhocks and day lilies for the more difficult days of July and August, when toward fall, chrysanthemums and dahlias come into their own. In this way, the color scheme may be constantly varied yet constantly harmonious. One color dies down as something else comes to life to take its place, and the garden is a pulsating and exquisite living being. There are even some perennials that bloom the first year from seed, and these may be admirably incorporated. Among the more familiar may be mentioned snapdragon, delphinium, sweet william, flax, forget-me-not and others. Consult your seed catalogue.

GIVING THE ARTIFICIAL WALK A NATURAL TONE

An example of profusion of garden planting with due regard to color and combination of flowers

It is necessary to know the heights of the flowers you contemplate for the garden in order to avoid planting the taller ones in front of the smaller. It is necessary to know the colors in order to avoid a clash of tints and shades that would prove inharmonious in close proximity. Finally it is necessary to know the time of blooming so as to secure the proper succession. If any of you want a list of some of the flowers and facts in handy form just send your request and a stamp to the Garden Editor of NATURE MAGAZINE.

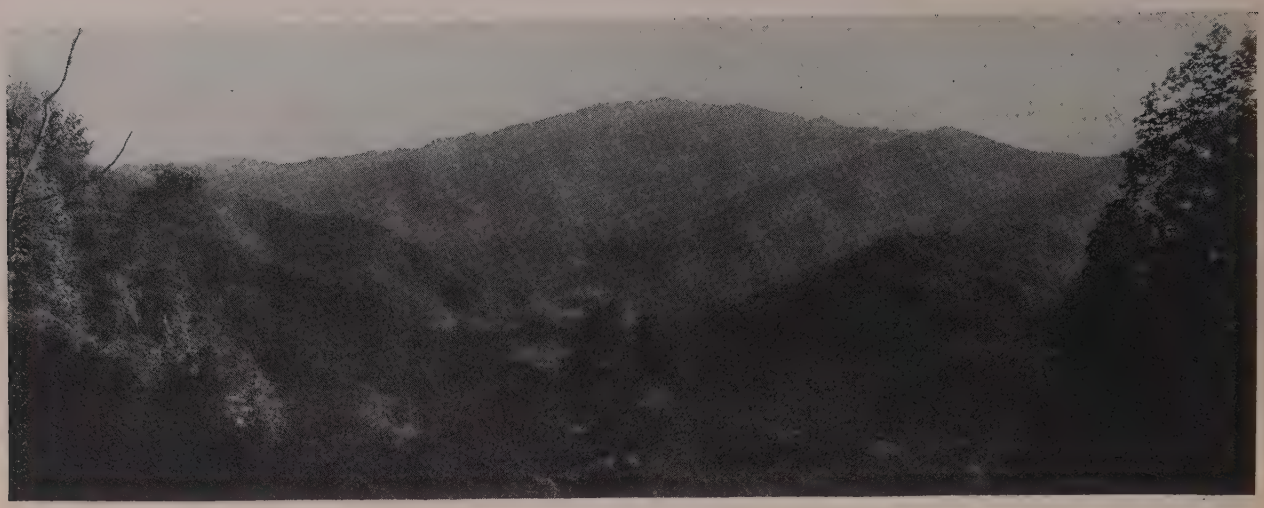
For the gardener in search of quick results, vines are a fine addition. The blooming period for most vines fortunately comes after the rush of spring flowering shrubs, most varieties blooming in July, August and September when there is rather a scarcity of desirable flowers. The Virginia creeper is not only pleasing in summer, but doubly so in autumn when its green gives place to a brilliant crimson and a rich maroon. The Dorothy Perkins rambler rose is a most charming vine when in full bloom and has the merit of being quite attractive at other periods, with its rich, dark, shiny green foliage. The trumpet honeysuckle is a favorite wherever grown, with scarlet and orange flowers throughout the entire season. The good old morning glory is a rapid grower, and when trained on the house can reach the second story by midsummer. Any of these, and many others, form a charming garden background and require so little care that their growth is almost automatic. They may be trained not only on the house, but more intimately over door and porch, fence or pergola, and on the ground itself over barren places.

A decided addition to the small garden, even in a city background, is had in the use of the bulb plants, and none will more richly reward the amateur for tending them. Tulips, hyacinths, narcissi, crocuses and others begin early in spring, and others continue throughout the entire flowering season, in a lovely succession of bloom. The great ease with which they are brought to flower, and their adaptability to various conditions of location and soil are accountable for their usual thriving and decorative aspect.

"One touch of nature makes the whole world kin", and there is something about the companionship of growing flowers properly assembled and cared for that seems to evoke the finest human qualities that are latent within us. When we plan our gardens for continuous bloom with its kaleidoscopic development ever fascinatingly going forward in its wonderful, inscrutable way, we gardeners can certainly feel with Wordsworth, that "Nature never did betray the heart that loved her".

With the July issue of Nature Magazine we will journey again into Glacier National Park with the American Nature Association's Expedition. Arthur Newton Pack completes the story of the trip with the fourth article and Mr. Horsfall has done two beautiful pages of color illustration also.

Those who recall the story of Sky-King, the eagle, contributed last year by Ben East, will be interested in the sequel in the July issue, in which the author tells of placing migration bands upon the legs of Sky-King's sons.



MT. LECONTE—A KING OF THE SOUTHLAND HILLS

OLD BUCK-EYE

From the trunk of this gnarled horse-chestnut has sprung a young hemlock, growing fast

THE SMOKIES

Peers of the Eastern Ranges

by E. Laurence Palmer

Photographs by Thompson Co.

"Fo' CLOCK! Time t'get up if you-all's 'gwine to d' Smokies".

We rolled out at the darky's insistent plea, and four-thirty saw us chugging out of Knoxville through the dawn on our first visit to the Great Smoky Mountains of Tennessee and North Carolina. We were off to travel over the "House-top of the East"; we were explorers prospecting for adventures in new hills!

The sun peered over the mountains and the mists cleared away. Our friend, who was acting as guide, showed us the new land flicking out now and then between the trees, and named off the circle of peaks that stretched from east through the southwest. There was Mt. LeConte, a king of the ranges, which we were going to climb that day, and there, the rippling summits of Mt. Guyot and Mt. Lumadaha, the sentinels at the northeast gateway, and more than 6,000 feet high. Clingman's Dome lay to the southward, while below it was Siler's Bald, whose crest glittered strangely in the morning light. Gregory's and Parson's Balds gleamed to the southwest,—the guardians at the outermost boundaries.

We saw at once how different this region was from the Rockies or the upper Appalachians. Here the mountains rise precipitously from their bases, in some cases more than a mile, and there are sharp slopes and quick drops, and thick, riotous undergrowth piling up in tangled ravines; but the roughness and the wildness is calmed by thick forest robes which make the ranges softly beautiful in the distance. Here

ROBED WITH GLITTERING BEAUTY BY WINTER SNOWS

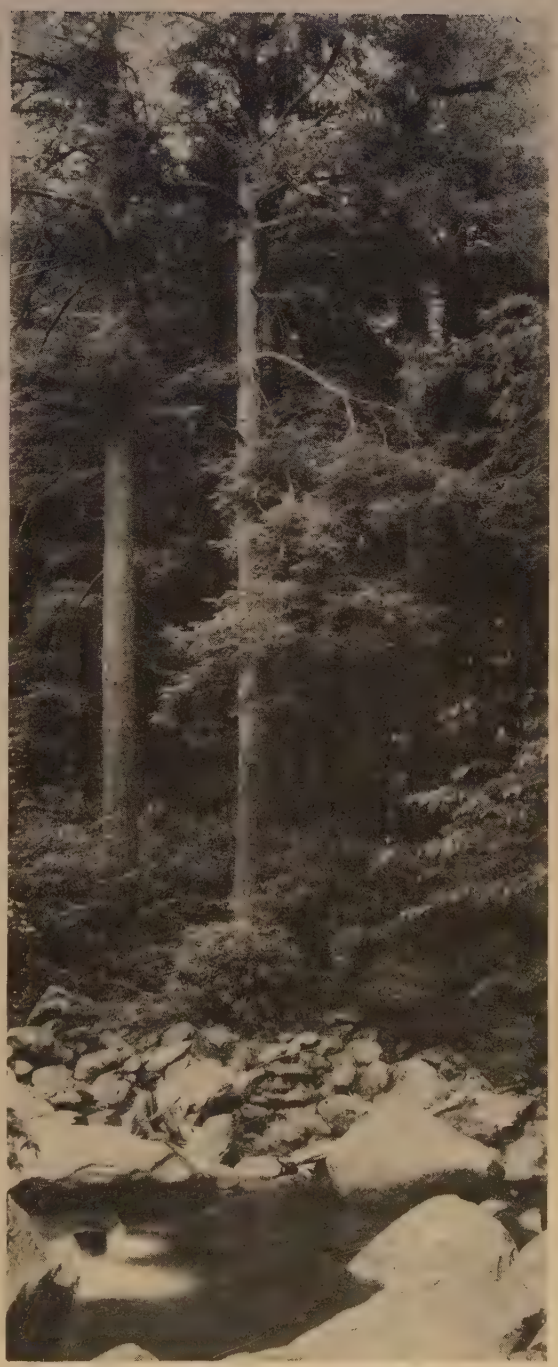
The Great Smoky Mountain National Park is about to be a reality; the dream of Tennessee and North Carolina is to come true. Nearly all, if not all, the money needed to purchase the four hundred and twenty seven thousand acres which will create the park is available, thanks to the five million dollar donation of the Laura Spelman Rockefeller Memorial, to the equivalent of two million dollar contributions by the respective state legislatures, and generous popular subscriptions. As soon as negotiations can be completed with the six or seven lumber companies owning most of the holdings, these virgin forests and rugged valleys will belong to the nation, from all parts of which citizens will come to enjoy a new wildness and an unusual beauty,—come to be explorers in America's newest, and oldest, hills.

are not jagged rocks and bare gaunt summits, but only warm, rolling hills.

The guide told us of some of the beauties hidden away among the foliage,—of Abrams and Bridal Veil and Rainbow Falls, of Huggins' Hell, and of Alum Cave Bluff, which overhangs, threatening, the side of Mt. LeConte, and where, if one is quiet, a raven may appear, or perhaps a pair of golden eagles.

As we journeyed through the growing day, we learned the past of these southern out-croppings of the Appalachian chain. The Smokies, our friend said, are among the oldest of American mountains. They were old when the western Rockies were just rising from the water; the Alps and the Pyrenees are children compared to them. The hardwood forests of America embraced these disintegrating hills in days when they reared even greater bulks. As aeons passed greater and greater varieties of flowers and trees sprang up, making the region a botanist's paradise.

Until a few years ago, he said, these ranges were considered liabilities,—barriers which kept the commerce of North Carolina and Tennessee apart. They were little known, impenetrable. Now they are assets. New roads are being built through them. Those who take their Nature from a car may circle the base of the mountains through Maryville and Gatlinburg in all comfort, and soon will be able to take the now partially completed highway through picturesque New Found Gap from Knoxville to Smokemont, North Carolina. A



A FOREST GLEN

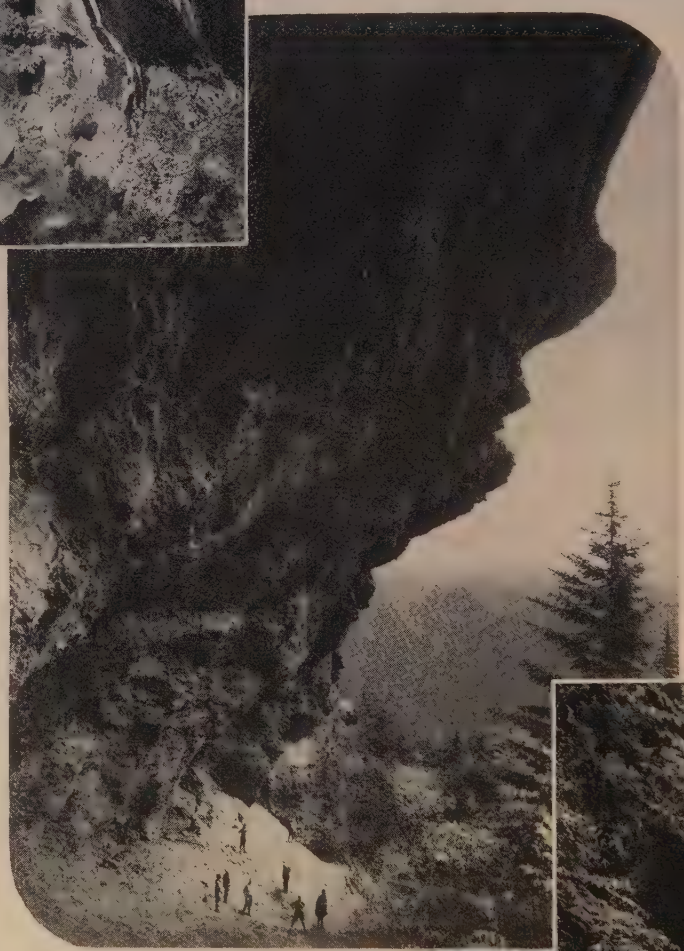
Here the whispering of hemlocks and the bustling of a brook, here the peace of the hills

RAINBOW FALLS
Here the water shimmers downward for more than eighty feet in an iridescent veil

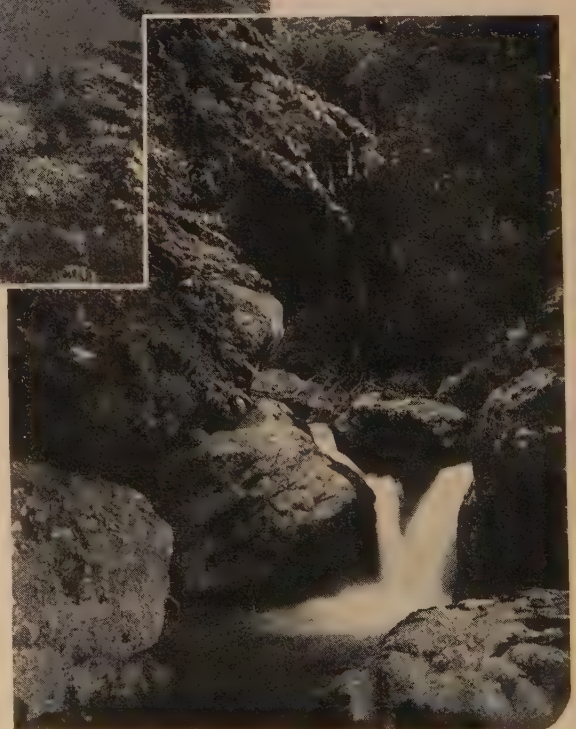
Tennessee, and Charleston, South Carolina. Boston may be the "hub of the universe", but these mountains seem to be nearly in the center of the East.

Finally Gatlinburg, and we struck out on foot over the smooth road to Cherokee Orchards, part of an extensive arboreal and ornamental plant development. Then the climb started. Those preferring Nature on the level should never try to climb Mt. LeConte by way of LeConte Creek. We passed into the dense forest of chestnut, sycamore, oak, gums and persimmon, and strode between great, gorgeous tulip poplars. Galax lay under foot, and beds of mosses. Azaleas and rhododendrons rioted on either side, and we could mentally picture them in bloom.

We understood what Asa Gray meant when he said that he could find more kinds of trees in a thirty-mile strip of this region than he could travelling diagonally through Europe. We passed Rainbow Falls, where the thin spray of water shimmered downward for eighty-three feet, iridescent in the sun. Hickory, maple, and buckeye merged into birch, beech and hemlock. As we went higher, and could glimpse the lowlands stretched out below us in long fertile fields and white-shining ribbons of roads, we found ourselves in forests of the hardier fir, and amid



ALUM CLIFF
Among the ledges a golden eagle may appear, or perhaps a jet-black raven



MILL BROOK
Swift-flowing waters, tumbling ever downward, foam and boil as they take their plunge

part of the Appalachian Long Trail, from Georgia to Maine, is being built here, to supplement the network that now reveals the beauty of these mountains. Tennessee and North Carolina have become Nature-wise.

As soon as 427,000 acres of this country are purchased for the government, we were told, the Great Smokies will be declared a National Park, and eventually the entire 704,000 acre mountain tract may be included. Its future status is assured now, so one day some of the largest stands of virgin timber and the highest mountains in the East, together with beautiful valleys, water-falls and startling bluffs, will be embraced in another of the outdoor and tourist meccas of the nation.

We learned from our well posted friend of the ideal situation of the Great Smokies. They lie half-way between Chicago and Tampa, Florida; half-way between the Mississippi and the Atlantic Ocean, likewise half-way between Memphis,

the wealth of low-lying plants typical of far northland life zones. Our feet sunk into a rich mossy carpet, and the broad green leaves of graceful ferns brushed us on the sides of the trail.

We spent the night at Jack Huff's cabin, in the bow of the saddle that makes the peak of LeConte, and a treat it was. Only fir-covered bunks and open fireplaces; and you bought your food at the "store", which was a box nailed on two trees. But there was good-fellowship, and a beautiful soft landscape that shimmered faintly when the moon came up, and sound sleep with the odor of balsam in your nostrils.

Mountain climbers climb for scenery and we were no exception. We climbed to the pommel of the saddle, and gazed out over the rolling ranges. Below us was the meadowland, and to the east loomed Guyot and Lumadaha, nearer and more friendly than ever. To the southwest were the largest of the mountains, Clingman's Dome and the picturesque Chimney Tops, strange, castellated ridges rising abruptly to meet the clouds. We looked over Huggins' Hell, a wild, tangled mass of forest. Always we found the deceptive softening effect of the cover of heavy foliage. The White Mountains of New Hampshire have a ruggedness born of a five thousand foot tree line; the Rockies boast of towering cliffs, and even the Adirondacks gain by the wildness of bare stretches. But here are continually the trees. We became aesthetically thirsty, too, gazing out over the expanse of woodland with never a splash of lake to relieve the green. The Smokies, however, have the sheer naturalness and primitiveness of untouched wilderness, and are different. They cannot be compared with any other range,—they stand alone.

Perhaps the LeConte region lacks the attractive gorges of the Finger Lakes region of Central New York. And we missed our view of shimmering bodies of water which we had often seen from Mt. Marcy in the Adirondacks. But we did not regret the lack of mosquitoes, which seem to be absent from these hills. We didn't find the accommodations on the mountain-tops that characterize the inns of Yellowstone and other National Parks, but there were not the silk-gowned habitues sitting around "roughing it". We cooked our own meals, we exercised our muscles, and we saw a unique country, alive with interesting birds of the heights, primitive in its mountain fastnesses where bears and wildcats roam, and rich in sharp-lifting ridges, that are covered with the blaze of rare and beautiful flowers.

With the popularity which is coming to the Smokies, it is to be hoped that the opportunities for splendid pioneer exploring will not pass away, and that the charm of its present undeveloped, unimproved condition will not be lost. The general effect of the Smokies could not be removed, but the roughness, the naturalness, the sense of the primeval could easily be marred. It is the very virginity of these hills which must be preserved.

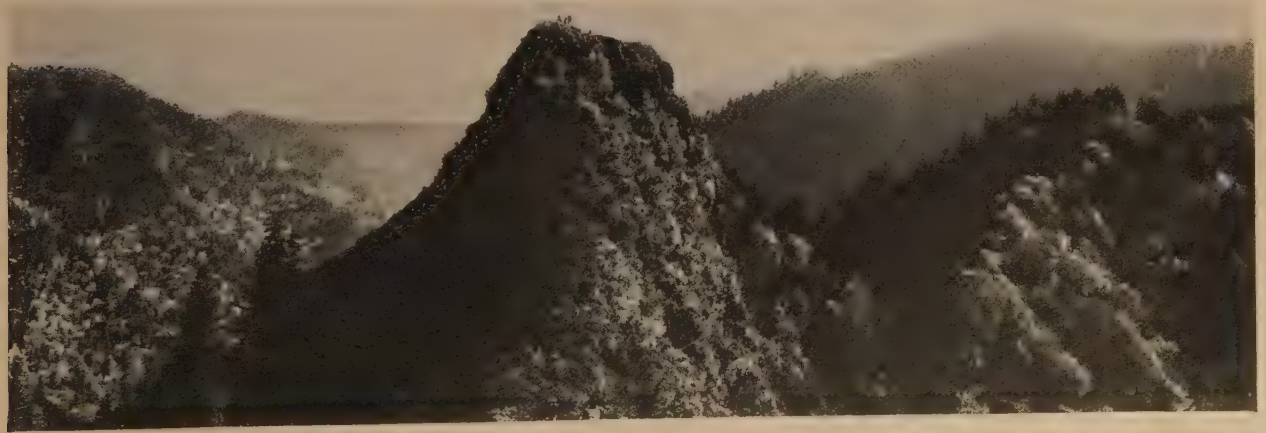
As we made the rapid descent down LeConte I made a wish that sometime I may spend a few more days in the Smokies while they are the same. I vowed that a vacation time would find me back there, if I were in the East. And I remade my vow as I looked again for the last view, to see the purple gloom of a late October twilight steal over the earth, and the Great Smokies, like shadows, fade from view.

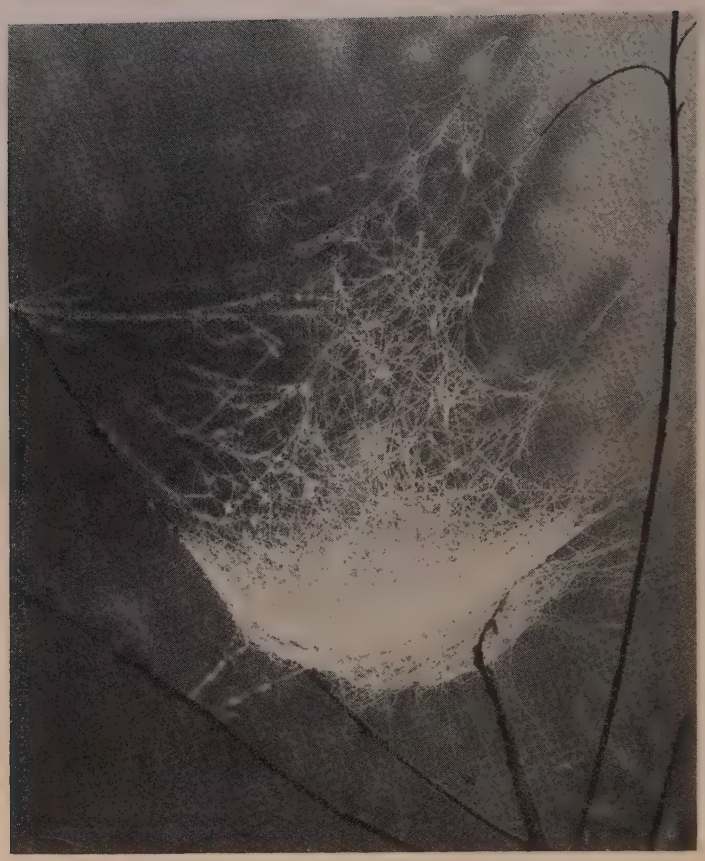
CHEROKEE ORCHARD

Below the rugged heights of Rocky Spur stretches a pleasant plain, where shapely trees and plants riot in profusion

THE CHIMNEY TOP

Slowly, slowly did the waters and snows of aeons taper down this graceful summit, which is older than Alpine peaks





A SHIP WITH ALL SAILS SET

A Morning in June

What So Rare, Bedecked in Nature's Pearls of Dew?

by Hugh Spencer

Photographs by the Author

"WAKE UP", sings the robin. "Wake up", pipes the phoebe. "WAKE UP", screams the blue jay. We wake and look out. It is the morning we have been waiting for and we are soon abroad, camera in hand in the midst of wonderland. The magic alchemist of night has decked the bushes with fairy necklaces fated to vanish with the first rays of sunlight. A veil of atmosphere has transformed yesterday's clump of trees into a tapestry background for our outdoor studio. A trip through the tall grass and bushes on a dewy morning and we are soon soaked with the dew that, they tell us, holds health-giving treasure.

Epeira, the garden spider, has caught more than she wanted in her web, for every thread is hung with glistening drops of dew. Each silvery globe is a spherical mirror, reflecting sky and trees and earth, all upside

A TENT CATERPILLAR SLUMBERS 'NEATH A BLANKET OF DEW

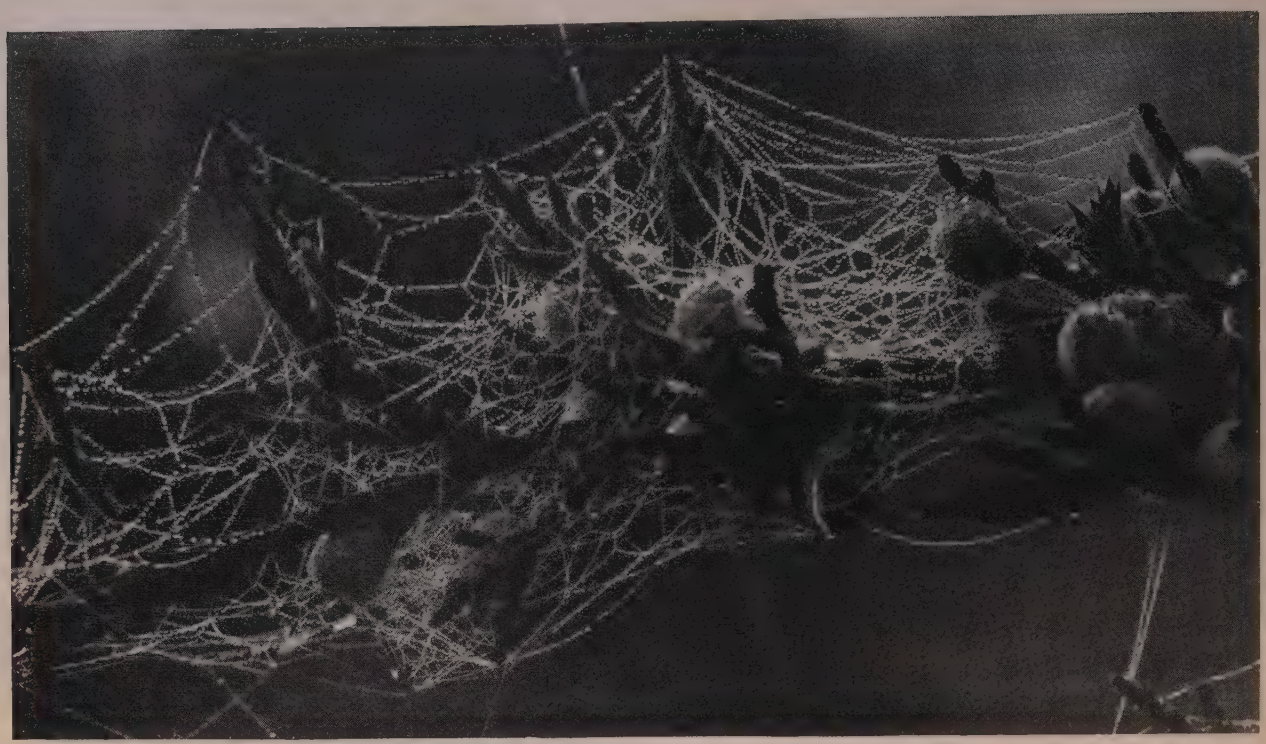
ASPARAGUS LEAVES BEDECKED LIKE A CHRISTMAS TREE

down. Some of the webs have broken under the load of the night. The owner of the web we find not usually at home at this hour of the morning, but, more likely, reposing in the shelter of some nearby leaf.

Not every web is hung to please the photographer, but we find a few suitable for our photographic game bag. Our hunting is not ended with the finding of our quarry; we must set and adjust the camera with more than ordinary care for so delicate a subject. The slightest breeze sets the web a'dancing; a heavy gust scatters the drops and sometimes breaks the web. There's enough hazard to make the hunting interesting and we know that another thrill awaits us later when we watch the image as it appears on the plate in the dark room.

SOMETIMES THE LOAD IS TOO GREAT FOR THE WEB TO HOLD UP

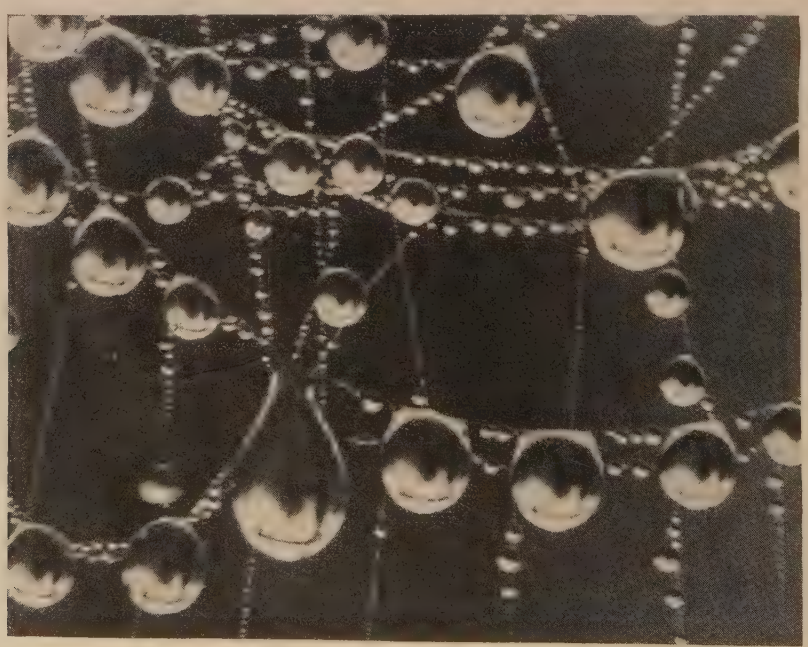
EPEIRA HAS CAUGHT MORE THAN SHE PLANNED FOR IN HER WEB



MAN WITH ALL HIS MACHINES CANNOT DUPLICATE IT

"Twin" webs on the cedar set one to speculating,—has some spider, more enterprising than the average, built a second web to catch whatever quarry escapes the first? Or, are there two neighbors, and do they always live in harmony with each other? On the ground we find a funnel web with the owner in his doorway, like some miser gloating over the treasures that have fallen into his door-yard in the night. How disillusioned he will be when the sun breaks them into a myriad of atoms and scatters them into the air again. But we, with our camera, have captured them and can keep them permanently in our treasure chest. Further afield we find another kind of web, like a treasure ship with sails all set for a journey.

On the way home we discover a caterpillar in a peach tree slumbering under a load of dew. The twig with its occupant is gently clipped from the tree and taken to a more convenient place to be photographed. Then we, our game bag full, drenched and happy, return to the house for some dry clothes and some breakfast. Aye, how rare a morning in June, when "The hill-side's dew pearled. . . . All's right with the world"!



EACH SPHERE A CRYSTAL MIRROR REFLECTING SKY AND TREES AND EARTH

LORENE SQUIRE

OPEN MOUTHS AND THE WORM

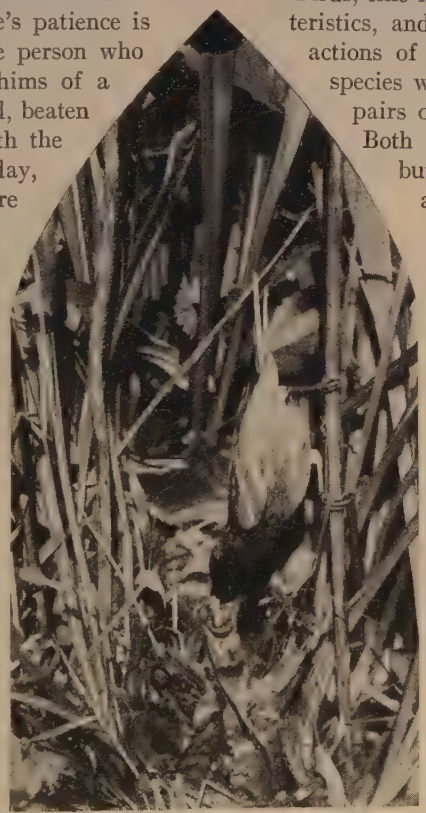
Measuring Young Birds' Capacities With The Camera

By L. W. Brownell

Photographs by the Author

TO HIM who truly loves birds, the pleasure of photographing them is the greatest that can be enjoyed from the use of the camera. There are exhausting disappointments; one's patience is strained to the breaking point. The person who cannot wait for hours upon the whims of a feathered subject, then leave the field, beaten and stiff with keeping still, but with the determination of returning the next day, will never succeed. The successes are so wonderful however and, occasionally, so unexpected, that with each one the failures are forgotten, and future difficulties only add zest to the chase.

One must have real knowledge of the habits of birds before he can expect results, and at times he will find that all his lore will fail him, for the vagaries of a bird surpass those of a beautiful woman. I have often sat for weary hours at the end of my one hundred feet of tubing, while the eye of my camera gazed glassily at the nest of young, waiting, while the old birds hopped around and examined me from all sides, went nearer the camera than to their nest, and alighted on the tripod,—but they would not approach their bawling youngsters while either the camera or I was there. Finally I was forced to pack up and leave for fear that the absence of the parents would be fatal to the young.



ONE AT THE TIME

'Tis a ravenous, noisy pair of children that the blue-winged warbler hangs head downwards to feed

Birds, like humans, have their individual characteristics, and one can never be certain, from the actions of one bird, what another of the same species will do. I learned this truth from two pairs of brown thrashers several years ago. Both had young just out of the nest. All but one of each brood had either strayed away or were carefully hidden. The youngster of the first pair was exceptionally obliging, and remained for some time upon the branch I selected, patiently waiting for his parents to bring him food. They refused, although they stood nearby, and kept coaxing the bird away from the perch on which I had stationed him. Many times I replaced him. After an entire morning of hopeful waiting, I gave up.

The second pair, however, were less cynical and more optimistic. When I found them I ruefully thought of my previous experience, and it was only true philosopher-photographer spirit, cultivated through the years, that led me to set up my camera and try for a picture. The youngster settled comfortably on the perch I had chosen, and I focussed my camera. Like a flash one of the parent birds, which

(Above) WHAT NOW?
The return of the mother wood thrush is a signal for open beaks and hungry sounds

HOLD IT!
A field sparrow and offspring partaking in the spring drama which the film recorded

season, when their anxiety for the welfare of their young overshadows their instinctive dread, they will be most apt to go about their duties while the bright, reflecting disk of the lens creates a fearsome strangeness near their nest.

The usual course of procedure which I follow is to set up my camera and focus upon the nest or the perching birds, making sure that from whatever angle the parent bird might approach, he would be included in the vision range. All the intervening foliage is then either cut or tied back, and I retire with my hundred feet of air-tight tubing and the bulb, which when pressed will release the shutter, to some shady nook where I can comfortably settle down for my indefinite wait. Sometimes I camouflage my camera and tripod with branches, or cover it with dark green cloth. Occasionally photographers have worked under an old umbrella, which supplemented with cloth has formed a tent under which both operator and camera can work, but mine for a cool canopy of leaves rather than such a hothouse arrangement.

(Below) ESTRANGED
There seems to be family differences between these bluebirds. Perhaps the worm was tough

had been hopping around a nearby bush uttering the rather disagreeable thrasher cry, flew to the young one and began to feed him. I was so astonished I did not even draw my plate-holder slide. Then both the birds began to cram the infant, utterly ignoring me, while I snapped shutter after shutter. When I had finished, the young bird was still placidly, albeit somewhat rotundly, sitting on the same perch.

Rarely do both birds visit the nest or the young on the perch. When it does happen, the photographer writes reams about it in his diary, and dreams of it at night. More often only one bird will approach, while the mate looks on from a safe distance. I have even seen one of the birds bring food to a neighboring tree or bush, while the other parent relayed it to the young. In most of these cases the cowardly one has been, —I relate it with shame and bowed head,—the male.

The fear of mankind has grown in birds through the ages, but careful management and gentle treatment will usually make them tolerant although hardly approving of human approach. While they can be photographed at other times, during the breeding

The necessary outfit consists in a long focus camera with rear and front extension of bellows, a good, heavy tripod, and fast lens, though not the fastest. I usually employ with satisfactory results a Tessar series IIb working at f.6.3., fitted to a shutter capable of making automatic exposures ranging from one second to 1/150 of a second. I should advise either a 4x5 or a 5x7 size. The use of portrait film, instead of plates, is advisable in as much as it is lighter, and unbreakable. Of course an almost necessary adjunct to this outfit, if one is going into the work seriously, is a camera of the reflex type, but this is not indispensable and in fact, I would advise the beginner to wait until he had thoroughly mastered the use of the tripod camera and had come to the point where he felt the need of the other before buying it. I had made a good many hundred negatives before I owned one.

(Above) GRUB-LADEN
The red-eyed vireo alights on her be-ribboned nest just as the camera lens blinks

Unless the individual has due respects for the rights, privileges and duties of birds he does not deserve success in this field. They, and not us, own the nests and their contents,—we are but prying

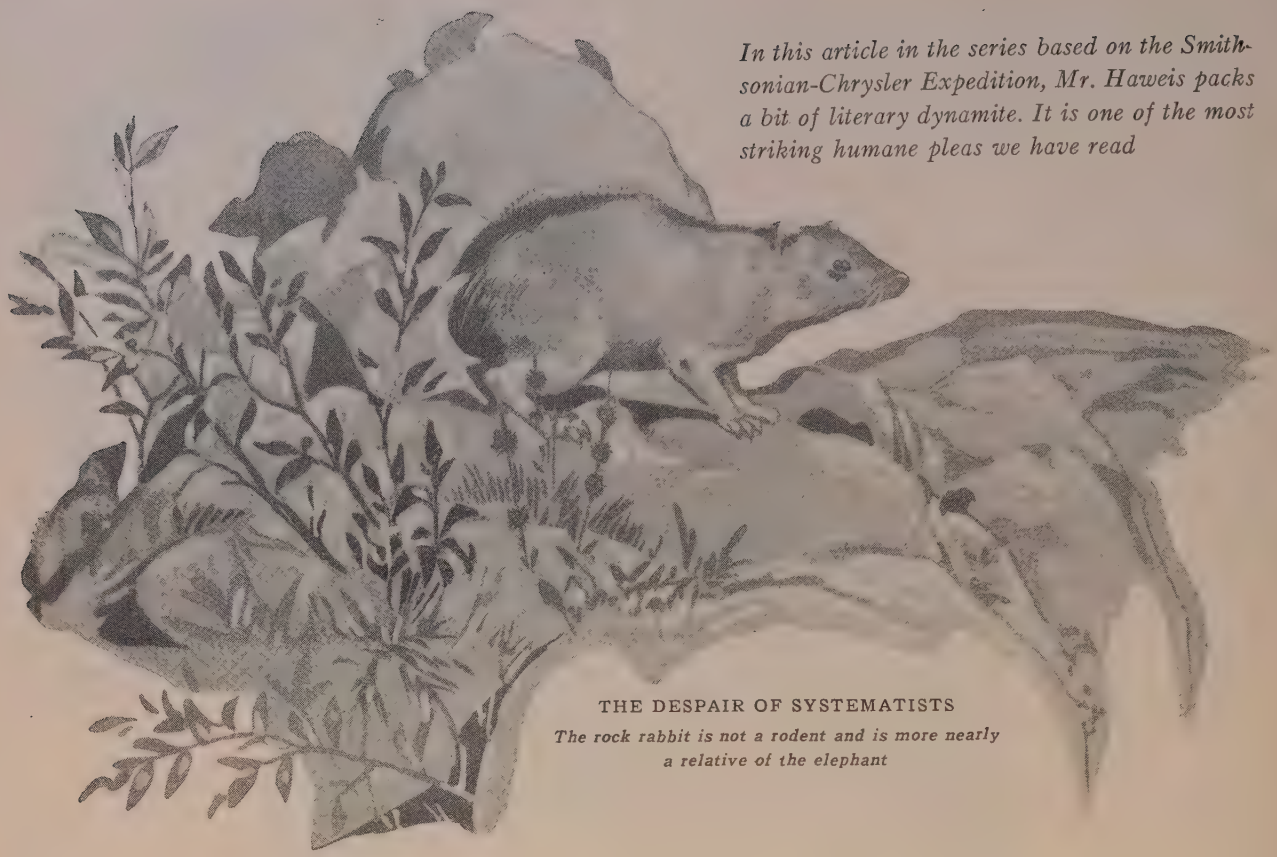
A LA CARTE (Below)
Back and forth bustles the female red-wing blackbird, while her rapacious infants ask for more

OPEN WIDE!
No bug or worm is too big to satisfy a young brown thrasher, whose mouth is enormous

creatures, tabloid publicity reporters, if you please, picturing their private and entirely domestic affairs. We are bad at our best,—we fuss the old birds, worry them to neurasthenia, disturb their peace, and play tricks with their young, and for no reason at all, as far as they can see. Ours must be a creed of gentleness and courtesy, since we are visitors. Young birds in the nest, if exposed to the direct rays of the sun for any length of time, will die. The old birds cannot be kept away from their young for more than a few hours at a time. We must observe the rules, for after all, we give them nothing, while we are greedy for every pose, every movement that they will make before the camera's blinking eye. In return, we must play the game.

A great deal of patience, and a little cooperation, however, a little spirit of friendliness between birds and man, will bring many pleasant hours in watching all the comedy and tragedy of the great spring drama. An occasional climactic happening will cause high blood pressure and racing pulse. And always there will be great satisfaction,—and incidentally, a rather fine album to show your friends on a rainy Sunday afternoon.

In this article in the series based on the Smithsonian-Chrysler Expedition, Mr. Haweis packs a bit of literary dynamite. It is one of the most striking humane pleas we have read



THE DESPAIR OF SYSTEMATISTS

The rock rabbit is not a rodent and is more nearly a relative of the elephant

"Only a Rock Rabbit"

So the Great Hunter of Elephants Said

by Stephen Haweis

Illustrated by the Author

In the vast sandy plains about Dodoma there are several kopjes which look small only because the plains in which they stand are so very large. They are like handfuls of pebbles between which the moss has grown, enlarged a millionfold. The grey green between the rocks is found, when you come up to it, to be waving, half-dried grass which resembles disordered hair. These grass patches are trodden flat in places, and that is because the herds of impalla or other buck which feed in the lowlands during the daytime, sleep on a grass-covered knoll at night where they lie soft, and from which they can see the approach of an enemy in time to rise as one and slip off amid the undergrowth of the large trees; for the lion and the leopard also live here,—and they must eat.

Near the top of one of these kopjes there is a mighty granite boulder which harbors another kind of creature. The rock is as smooth as a potsherd and, seen from below, something like little brown ladybirds may be descried running to and fro upon its brow when the great heat of the African sun permits them to do so. Morning and evening the hyrax meet and play, and eat and survey the low-relief map in gold and grey and russet spread out beneath them, just as they have done since Biblical times, for they are the coneys of the rocks which live in holes and crevices of the mountains. These are the ones whom Solomon pronounced to be so wise and which were dubbed unclean by Moses because, like the stenographer, they chew the cud without dividing the hoof. To be sure the hyrax does not really chew the cud, any more than doth the stenographer, but they do incessantly seem to be champing something.

The hyrax are a most interesting little people, about the size of rabbits, but they are not rabbits. They are not even rodents and have long been the despair of systematists. Structurally they are related to the ungulates: they have three toes only on the hind feet, four on the front, and the man in the street will be charmed to hear that the malar bones are thrown back into the zygomatic arch, —which gives them a distinct link with the elephant. One of their oddities is that the hair in the middle of their backs is mobile and can open and shut like a book, and it is a warm creamy yellow, whereas when closed, the animal is an undeniable barn-door rat-color. Sometimes you may see hundreds of these little people sitting out in the sun warming their waistcoats or telling each other stories. You might guess that the rocks would be soiled and spoiled by so many but

no, unlike birds and bats, they do not soil their promenade and parade ground but believe, like human beings, that cleanliness comes next to godliness.

From the hyrax citadel Dodoma is no more than a few white crumbs on the patterned table-cloth of the world. The Tanganyika railway is ruled through its midst with a double pen and faint white roads wriggle uneasily across the countryside to be lost in the hills. On one of them something like a small beetle ran very swiftly and suddenly stopped dead. The hyrax saw it because they see everything, but it did not occur to them that what looked like a beetle two or three miles away must be a very large one.

Three people got out of the car: first a big man in a topee, in very short khaki pants and multipocketed shirt. After him came a pretty girl, dressed almost exactly the same except that whereas he wore rough gaiters of canvas, her slim white legs were bare to the ankle.

"Give me the shotgun, Albert", she cried, "we may see some guinea-fowl on the way up. And take care of my precious .375. I'll never find another rifle which suits me so perfectly this side of the tomb, not if I live to be as old as Jimmie". She cast a sidelong, quizzical glance at Jimmie.

THE MAN AND THE GIRL APPEARED
Their voices floated upward like a faint echo from the remote past

The young man smiled and Jimmie flushed as he led the way up the mountainside followed by the young Diana and the youth who had driven the car. Presently he turned and said: "Belle, if you haven't got the field-glasses they're on my bed at home. And we've absolutely got to have them; it's no good going after buck without glasses. They've been forgotten"!

"I'll go back", said the youth, "it would not take long".

"You wouldn't mind? How dear of you", said Belle with sweet smiles, "we'll keep to the path till you get back".

James Borthwill, the great elephant hunter, trudged up the hill.

"Jimmie, . . . Jimmie, you didn't mind, did you . . . not really? You know I don't think you're old"!

"Many a true word spoken in jest"! he sighed.

"You old silly,—there I've done it again! You're only about fourteen really, if you were more than about fourteen you'd, . . . you'd have, . . . "

Jimmie flushed anew to the roots of his silvering hair and was on his way to prove that he was over fourteen when Belle raised her gun and fired.

"Kanga", she said, "a flock . . . about thirty, I should think . . . didn't you see them? . . . do see if I got one, I think I did, . . . there they go"!

"That", said Mother Hyrax from the recesses of a hole to the children who were scrambling down after her, "that noise kills at a distance, and you must learn to jump more quickly than that. Old bones ought not to be first down. Only the day before yesterday the Prince of the Kudus was standing on the lookout rock a hundred feet below here and I saw him fall dead a moment before I heard the sound,—or I thought so. It is well to have started running before you hear it".

"But how . . . "?

"I don't know how any more than the Kudu did, but that herd of Greater Kudu would not be without their prince today if he hadn't been standing still. As it is, there is one missing from the flock of guinea-fowl down there now. Didn't you hear what they were screaming about when they passed the big baobab tree? Well, it was the noise did that".

"Well . . . go on with the story of our three toes and why we are kin with Temba, the great-eared, the elephant".

"Mother finished that story while you had a nap. The gods of the hills asked our ancestor if he wanted to be bigger than Temba or if he would rather have lots of children. And he made our ancestor into a lot of little ones which got a fright and jumped out of his hands before he had time to finish sewing up the fur on their backs. And that is why we always run down holes at the slightest sound".

"And that's why our fur opens down the back", said another.

"Do go on telling us about the days when Simba, the lion, ate nothing but berries, . . . though I must say that's hard to believe, and Mbweha, the jackal, lived upon nut-shells! Tell us some more, Mother, please".

"Yes, pleeeee . . . ase", said the other little coneys.

And somebody, wheeling round and round in the sky,—Kosi himself and no other,—might have been heard to mutter: "Yes, and come out on the rock to tell it; a falcon can't live on exercise alone. The old days are gone and I haven't had a bite to eat since the last gilt wore off the Golden Age".

"Well", said Mother Hyrax, when Kosi had gone and it seemed safe to venture out again, "it's true all the animals used to be able to talk as well as a hyrax, though now all except ourselves make meaningless noises. Even man, whose noises are the most discordant and terrifying of all, even he probably talked as well as you or I, in the ancient days"!

"Is man a kind of vulture, . . . without wings, Mother"?

"Very likely, I don't know, but he follows the big noise about and as soon as he hears it he points a stick towards the thing that is killed and that helps him to find it. He often carries away the dead: several of them came yesterday and hacked the prince in pieces, but I never saw or heard of man eating anything like that. Nyani eats a bird once in a while, but a baboon may do anything. I always thought man was a kind of baboon. Tai always eats whatever he finds dead just where he finds it, but man may be a kind of vulture; I have never been near enough to know if he has fur or feathers".

"Is there any chance that we will all be able to talk to one another again, and all be friends again and nobody frightened of anybody and everything"? asked one.

The man and the girl appeared suddenly out of the scrub still very far below the hyrax rock. They stopped before a grass covered hillock among the rocks and their voices floated upwards like a faint echo from the remote past. Perhaps they answered the question unwittingly. Half dried blood, clotted in holes, the reddish smear upon the yellow rock and traces of hair proclaimed that it was the scene of a tragedy. Jimmie had his arm around the girl and one of her arms was round his waist; she carried her shotgun while he carried a heavy rifle and a new .22.

"This is my kudu", said Belle, proudly looking down at the stain and scraping up a wisp of bloodstuck hair with the corner of her shoe. "The boys made a pretty good job cleaning up the mess, didn't they? And it is a darling pair of horns, and you were darling to let me have the shot". Jimmie squeezed her closer to him and, with the sun on his face and silvery hair he looked every day of fourteen years old.

"Jimmie", said Belle in mock alarm, "we could be seen with field-glasses".

"Let's risk it, just once"! said Jimmie Borthwill.

They clambered on together up another steep boulder which was opposite to the Hyrax rock.

"Funny we haven't seen anything but those guinea-fowl; I wish something would show up. I want to try this new .22", said Jimmie. "And I want you to try it", he added as an afterthought.

"Well sit down by me and tell me things".

The Golden Age!

"To be sure, why shouldn't it come again"? said Mother Hyrax. "What has happened once must be able to happen again, but I suppose there are reasons . . . reasons that we . . . eee . . . oh . . . ee, run babies, . . . oh my leg . . . what agony! It's dead, broken, it was the little death noise, . . . ah but so little", she cried, as she tumbled into the crevice between two rocks last of all.

"Darling! What has happened to your foot—it isn't there"? screamed the cubs all together.

"It was the death noise, but so little I didn't hear it in time, the wind must be going the other way, . . . but there isn't any wind, . . . oh my leg, . . . no foot at all, . . . only blood, . . . it feels as if I had a leg ten times the size and bursting slowly, . . . ah what pain, what pain"! she moaned while she tried to lick the stump which the bullet had left. The family huddled together in the dark hole dumb with misery. A new fear and a new lesson had been learned by the hyrax children. Then they heard the sound of footsteps approaching, they were footsteps of some large animal. Safe they were against all but the rock python in their fastness, and this was no snake that was coming. "I don't think you hit it, Belle, because here's your bullet. I think I did because I aimed a bit further over, it'd begun to move when I fired, . . . and here's a touch of blood. So I think I hit the little beggar".

"It was a darned good standing shot, Jimmie, I don't feel ashamed of missing that one sitting: it must be every bit of a hundred and fifty yards".

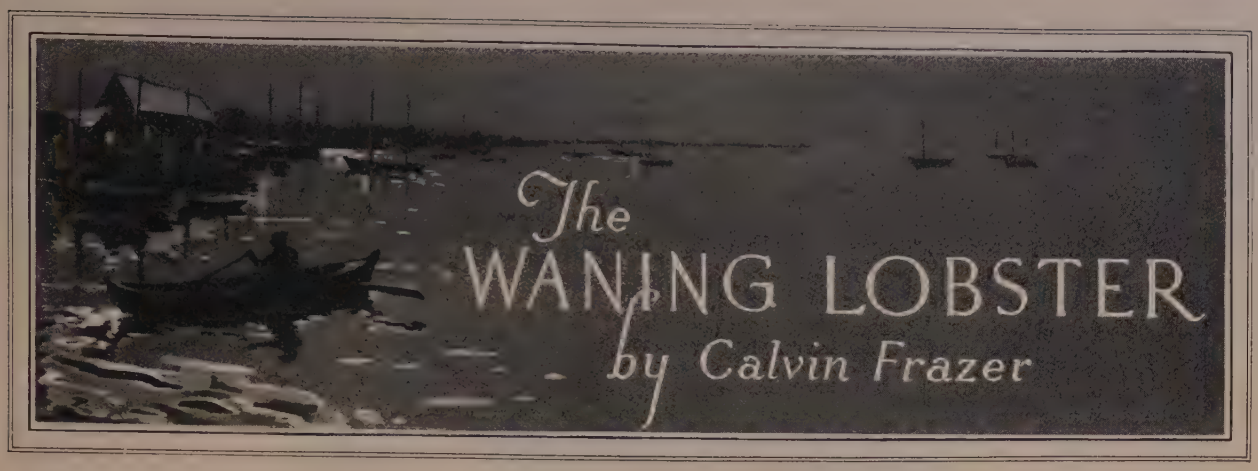
"Well, it's only a rock rabbit, not worth bothering to look for. Let's be getting on: I bet he's got something to occupy his mind for a bit anyhow"!

The girl scrambled on after the great hunter of elephants. "You are a marvellous shot, Jimmie", she said.

IN THE *May issue we announced that the October issue would be a California Number in accordance with an editorial policy of bringing out two or three times a year an issue devoted to Nature in one or another section of the country. For those who may have overlooked that announcement, may we repeat?*

From a beautiful and original front cover, through the entire editorial section, the October issue will be devoted to California; its birds, mammals, flowers, scenery, trees and all that goes to make it a remarkable State from the Nature point of view.

In order that many of our members who may wish to have extra copies of this issue or have copies sent to friends, may be informed sufficiently in advance, we are making this announcement. Extra copies will be sent to any four addresses for one dollar and more at the same rate. In order that we meet these extra demands for the California Number, however, orders should be placed in advance so that we may provide for them in the running of that issue.



The WANING LOBSTER

by Calvin Frazer

THAT lobsters are relishable food is no recent discovery. They were evidently a familiar item on the bill-of-fare of the sixteenth century, when Samuel Butler wrote his well-known lines in which the changing hue of the sky at dawn is compared to that of the lobster in the process of boiling, and when the French chef Vatel killed himself out of chagrin because the making of lobster sauce failed to arrive in time for a feast.

It is only in modern times, however, that this delectable variety of sea food has been marketed far and wide over the earth, thanks to improved methods of transportation, together with the introduction of canning. Unfortunately this enlargement of the lobster's field of usefulness to mankind has led to such strenuous search for him in the relatively small coastal areas that he inhabits that he is in considerable danger of vanishing from the world.

Though it is customary to speak of the lobster "fishery", the interesting animal we are here discussing is not a fish, but a crustacean. It belongs to a division of the animal kingdom that includes such diverse creatures as shrimps, crabs, wood lice, water fleas and barnacles. Moreover, there are several different kinds of crustaceans that bear the general name "lobster", including the "spiny lobster", which comes to the American table from the coasts of Florida and California, and which lacks the big claws of the lobster with which we are most familiar in this country.

SIR HOMARUS HIMSELF

The common American lobster, delight of epicures, and sadly waning in numbers

The common American lobster, *Homarus americanus,* is found along the Atlantic coast from Delaware to Labrador. When mature it never rises to the surface of the water, but lives exclusively on the sea bottom, where it walks about nimbly on its slender legs. These legs are not strong enough to bear the weight of its body if it is removed from its native element and placed on dry land, though under such circumstances it manages to crawl over the ground. In the water a contributory means of propulsion is furnished by a double row of little paddle-like appendages called "swimmerets", with which the lobster rows itself along. Lastly, it is able to dart backward with great rapidity by a bending movement of its muscular "tail," as the flexible part of the body is called.

The lobster's claws are a pair of overgrown front legs. Each claw is provided with a couple of forceps-like jaws, which serve the purposes of hands, teeth and weapons. The claws often attain half the total weight of the lobster. No characteristic of lobsters is more remarkable than their habit of shedding or "shooting" their claws. This may happen in consequence of shock or fright, or as a means of escape when the claw is seized by an enemy. The separation always occurs at a definite place. There is but little bleeding from the stump, and a new limb soon grows to replace the one lost. The slender walking legs are sometimes discarded and replaced in a similar way.

Sailors have long believed that a clap of thunder or the firing of cannon will cause lobsters to cast off their claws. In the old sailing days a man-of-war falling in with a fishing vessel carrying a cargo of live lobsters and desiring to purchase a supply of them for the crew would sometimes threaten to fire a salute if the price demanded was too high.

The American lobster as a rule lays her eggs but once in two years. The number of eggs laid at each spawning period increases with the age and size of the lobster and thus ranges all the way from three thousand to nearly one hundred thousand. The eggs are not discharged into the water to float until they hatch, as is the case with fish spawn, but become attached to the swimmerets on the under side of the mother's tail by a glue-like substance which is excreted simultaneously with the spawning. Here they remain and gradually develop for ten or eleven months, at the end of which time they begin to hatch. The hatching period usually extends over a week, during which the youngsters start life:

The lobster begins life as a tiny larva, of glassy transparency, with gleaming emerald eyes and a huge snout. Through the first few weeks of its existence it swims freely in the water and in the course of numerous moults, or successive castings of its shell, gradually assumes the appearance of the mature lobster. Young lobsters grow rapidly and must therefore moult at frequent intervals, as the shell is hard and inelastic and does not grow with the body. With increased age the rate of growth diminishes, and there may be intervals of years between successive moults. One of the largest lobsters ever captured weighed about thirty-four pounds, and, together with one of thirty-one pounds taken at about the same time, in the spring of 1897, is now mounted and preserved in the American Museum of Natural History, New York.

FISHERMEN PULLING IN A LOBSTER POT
A familiar sight along Cape Cod and on the coast of Maine, the centers of our lobster catching industry

The moulting process is thus described by Professor F. H. Herrick, a leading American authority on these crustaceans:

"When the critical time has arrived, the lobster turns over on its side, distends the membrane between the tail and the shell of the back until this finally bursts, and the whole body is then slowly drawn through the opening thus formed. The carapace is lifted up, the appendages are freed gradually from their old covering, and the tail comes out last. The old shell is thus discarded whole, the internal parts of the skeleton, including the lining of the stomach and the intestine, being simply withdrawn from the folds in the external skin in which they are formed. This process occupies five or six minutes. Immediately after the moult the lobster is limp as wet paper and perfectly helpless. The process of hardening of the new shell is very gradual, and it requires about two months to produce a shell as hard as the one cast off. 'Rubber shell,' 'buckle shell,' 'paper shell' and 'shadow' are some of the names in use to designate lobsters with new soft shells".

Lobsters do not migrate up and down the coast with the seasons, but in spring they come in closer to the shore and in the autumn they retire to deeper water. Their food includes living and dead fish and all kinds of mollusks, especially clams. Though they are great scavengers, they probably always prefer fresh food to stale. They are notorious cannibals, and when crowded together in cars or pounds they prey on one another to such an extent that twenty per cent of a stock of lobsters is sometimes lost from this cause in a few days.

Lobster fishing, or "lobstering", has been a flourishing industry along the coast of New England since early Puritan days. Cape Cod was the first important center of this fishery, but since about 1870 Maine has led the states in the production of lobsters. The American catch is, however, completely eclipsed by that of Canada, which produces far more lobsters than all the rest of the world combined. At one time the Canadian catch amounted to two hundred million a year. Lobsters were once such a drug on the market that the farmers about Chaleur Bay used them to fertilize their fields. Before about 1860 big lobsters retailed in New England at five cents apiece. The day of abundance has long since past, and the lobster is becoming a more costly luxury every year. Efforts at artificial propagation have been, on the whole, disappointing, as have also been the attempts to establish new fishing grounds, as, for example, by planting lobsters on the Pacific coast.

A MARTHA'S VINEYARD FISH WHARF
In the foreground two types of lobster pots. The vessel is a sword-fisherman with its bowsprit "pulpit"

The lobster is one of the few sea creatures that are captured in traps after the

manner of land animals. The lobster "pot," as the trap is called, was introduced into this country from Europe, as an improvement over the methods of spearing or gaffing that once prevailed in the American fishery. The pot varies somewhat in shape on different parts of the coast, but is usually an oblong or semi-cylindrical box of wooden laths, with open spaces between them through which undersize specimens can escape. The lobster enters the trap through a funnel-shaped opening of netted twine and usually is unable to find his way out. Bits of fresh or decayed fish are used as bait. The pot is weighted with bricks or flat stones and lowered to some good rocky bottom, where a buoy marks its location and also establishes proprietorship, as it is painted a distinctive color so that each fisherman may readily recognize his own traps. The pots are set either on single lines or on trawls having from three to sixty traps attached. Where lobsters are plentiful the traps are hauled twice a day, but on the New England coast, because of their increased scarcity, it seldom pays the fishermen to haul traps more than once a day.

The pots are tended from small boats and the catch is kept in floating "cars," moored in some protected spot near the shore. Welled fishing smacks gather the lobsters from the fishermen and carry them to the large distributing centers. Live lobsters are now shipped to all parts of the country in barrels, packed with ice. A large part of the Canadian catch is canned, but there has been little canning in the United States for the past thirty years on account of the more stringent laws in this country concerning the minimum size that may be taken.

In homes and restaurants the lobster meets a quick death in the boiling pot; a process that changes his color from dark green to brilliant scarlet. The poisonous "lady" and intestines must be removed before he is ready for the table. The former, which derives its name from a fancied resemblance to the outline of a seated female figure, is a unique feature of the lobster's anatomy. It is a complex stomach, lined with hard deposits of lime which serve to grind the food. The green "tomalley", or liver, and the "coral", or ovaries, are edible and are highly esteemed by epicures.

A Crop *from a* Compost Heap

Rare Delicacies for the Table Spring Up Over Night

by G. G. Nearing

The indispensable compost pile may sometimes yield unexpectedly and surprisingly. My compost contains nothing but clean straw, weeds and leaves. It accumulates all summer and fall, then is spread upon the garden as a mulch, the unrotted part to be raked off again in spring.

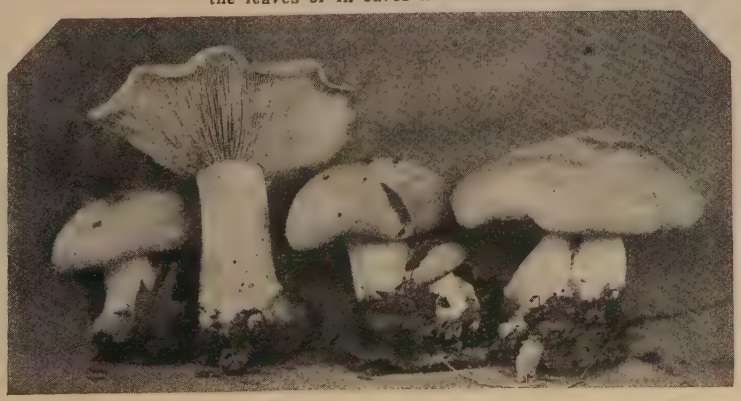
All summer fungi spread their white strands in and over the softening straws. Day and night they work their way into the hard tissues in search of food, which they store up for a rainy day.

The fungi are of many kinds, with no way of distinguishing them until they send up characteristic mushroom or toadstool forms. Often the same compost will produce half a dozen species at different times during the season. These may appear as single specimens, or in damp weather furnish pounds at a picking.

Perhaps the most valuable species is a lavender mushroom eaten in England under the name of "Blewit". It grows as large as six inches across the top, stocky and fleshy, with a stem occasionally as thick as a man's wrist. The color is nearly the same above and beneath, inside and out,—a pale bluish purple, shading to white in older specimens.

BLEWITS

These valuable mushrooms are hard to discover, as they hide under the leaves or in caves in the straw



Blewits, whose scientific name is *Tricholoma personatum,* find the clean compost ideal for growth, especially if the litter and straw are coarse and not packed down. They also grow on pure leaf compost in shady places. In order to identify them properly, it is best to procure a manual of edible fungi and familiarize yourself with the principal kinds, after which it is safe to pick, provided you use reasonable caution.

Although Blewits grow large, strangely enough, they are hard to find. They grow entirely hidden under leaves or in miniature caves among the straw. But six or eight of them will often make a pound, and they are the most delicately delicious of mushrooms, well worth hunting for. My compost produced five large blewits in late November.

Blewits, like most mushrooms, should be cooked slowly, and for rather a long time, —thirty or forty minutes at least. They may be stewed, broiled or fried. Even two or three will add immeasureably to the flavor of a meat stew. Mine did their part in a toothsome pot roast.

First Prize
"The Autograph of March Wind"

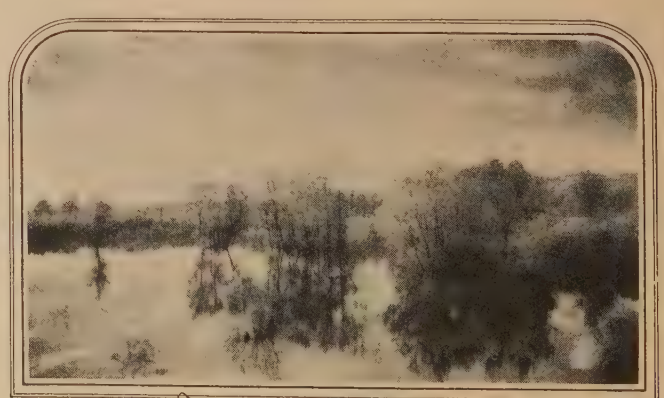
WILLIS W. WAITE, M.D.
EL PASO, TEXAS

Third Prize - "Off to Fresh Pastures"
MRS. W. F. ELDRIDGE
CORONA, CAL.

The third monthly contest for outdoor photographs has brought out many excellent pictures, as the successful ones reproduced here well demonstrate. Again we wish to thank all contestants.

We should like particularly to stress the two special contests for August and September,—the first devoted to pictures of offensive signboards and other misuses of the out-of-doors; the second, to attractive garden photographs. Pictures may be taken specially for these contests and we hope that many will keep them in mind as they travel about this summer or work with their gardens.

Honorable Mention
"Good Morning"
COLIN S. FARMER
TORONTO, ONT.



Honorable Mention
"Evening Reflections"
CHARLES B. YOUNG
DUBUQUE, IOWA

SECOND PRIZE
"The Little Fisherman"
GODFREY LUNDBERG
WINNETKA, ILL.

HONORABLE MENTION
"Reflections" (American Egret)
HARRIET WILLIAMS MYERS
LOS ANGELES, CALIF.

THIRD PRIZE
"Ground Hog"
MRS. A. B. KLUGH
KINGSTON, ONT

HONORABLE MENTION
"A Babbling Brook"
ED. BLACKSTOCK W. ORANGE, N. J

THIRD PRIZE
"Stepping Out"
(Young Spotted Sandpiper)
LEWIS J. MERWIN
NEGAUNEE, MICH.

This is another article in the series based on Dr. Vinal's camp visit made under the auspices of Nature Magazine.

YAWGOOG'S BROOK AQUARIUM

A netted-off enclosure affords a camp feature contributing fully in Nature interest

FISHIN' AT CAMP

Some Opinions on the Rights of Youth to Fishing Experience

by William G. Vinal

Director of Nature Guiding for the American Nature Association

To my mind, fishin' days are coupled with swimmin' hole days. Swimmin' has become a highly developed art in every camp, but fishin' is becoming a lost memory. And yet fishin' is perfect Nature lore. It brings every camper into close touch with the lake which he loves. It satisfies his impulse to explore. It educates toward individual fellowship with Nature rather than massed play on the athletic field. It gives him a quiet happy hour or two as a companion to Nature. He may see the reflections of the sky, feel the warmth of basking in the sun, or the tonic of the wind as it ripples over the water. He may by chance see the sunfish making a nest or a pickerel darting amongst the shadowy weeds. He may rest on a mossy bank. The darning needle, the whirligig beetle, the red wing are all his. Openings in the forest and distant meadows may lead him on. All of these make up a real fishing trip and whether he catches a fish or not is incidental—for he may have caught the spirit of going happily Natureward.

Before we go on to the general question of fishing and fishery rights, let us give a thought to aquaria which afford opportunity for intimate acquaintance with many fish and a knowledge of their life habits. At Lanakila we found a home-made aquarium that suggests much to other camps. It was made from two pieces of plate-glass about thirty-six inches square and set up on the outer edge of the piazza so that campers could stand and look down into the well lighted water. Nearby was a list of the inhabitants, while below was a turtle pen which took the overflow from the aquarium. This also was host to most of the living turtle representatives of the neighborhood. One of the turtles had been laying eggs and they were being hatched in a dish of sand. The boys were so interested in bringing in material that one of the counselors was kept busy taking things out at night to prevent overstocking.

Another successful type of aquarium was found at Yawgoog, the camp of the Greater Providence Council, Boy Scouts of America. This was in the form of a screened area across a brook, and near at hand was a bulletin board. The aquarium was on a Nature trail and running water kept the enclosure in excellent condition. The boys had great fun making a dam, clearing a pool, sanding the bottom, carpeting the banks with moss, installing a water wheel, and setting out water plants. Capturing fish with dip nets so as not to injure them, rounding up turtles, curving over the top of the wire to keep the snakes within bounds and weaving greenbrier in the upper meshes to keep a new crop of boys from leaning too heavily on the wire, were problems that were met and solved in turn. The brook aquarium at Yawgoog was the notable factor that was contributing fully to the summer's Nature experience.

"Feeding the fish" was a sport in two girls' camps. At little Wohelo hundreds of minnows came up to be fed, and at Onaway, when Mrs. Hollister stamped her feet on the floor of her cabin, the fish came up to eat. On a picnic supper her campers saved bread remnants for the fish and peach skins for the bustling chipmunks.

MAKING THE BOAT FOR FISHING DAYS TO COME
Boys at Tanager Lodge build their own craft with the help of "Daddy" Welch

From the keeping and feeding of fish it is but a short step to fish culture. Many camps would undoubtedly be glad to cooperate with the various fish commissions in the propagation of fish and in the stocking of various waterways. Conservation through education would have a far-reaching effect on the attitude of the camper toward future laws and problems. He would realize that one cannot always take without replenishing, hence the reasonableness of the fishing license, which gives a revenue for restocking. He would learn that conservation means right use rather than hoarding. He would perceive that the intelligent fisherman is not only a true sportsman but a conservationist. To instill such aims and ideals would involve an activity of great potential value in education.

You, Mr. Director, may feel that I am writing at great length upon the simple topic of fishing. Perhaps I am. But you may be interested in comparing these two answers that I got from the directors of two different camps on the same lake. The question was: "What fishing experiences do your campers have"? Director number one said: "A very few go fishing. It is not scheduled as it is not good fishing in the camp season. Then again, they do not like to put worms on the hook and they do not know how to get the fish to bite". This was the answer of director number two: "Yes indeed, we go fishing. The youngest campers cut their own fish poles, bait their own hooks, and clean the fish. Sometimes when they catch the fish they use them in their gardens in the same way that Samoset taught the Pilgrims. Sometimes they catch fish enough for the whole camp. My oldest counselor enjoys taking three or four 'upstream fishing' and this summer he caught a nine-pound lake trout. Our campers certainly get a thrill out of these fishing trips".

In this connection it ought to be made clear that fishing is altogether a different thing from catching fish, and a large per cent of the fun of fishing is the anticipation. Of course whether anticipation would keep one fishing until he became a hundred per cent keeper of fish is questionable but we must remember that conservation does not mean keeping, but right use for the greatest number of people involved. And, again, catching does not necessarily mean the hooking or killing of fish.

An unusual summer experience would be to study the primitive method of fishing in the locality,—perhaps the way the Indians did it. If a trap or weir was used, it was probably made of stakes and brush, and without nails. This would require thought and skill. The Indian had to carry on patient observation through the stimulus of hunger, but the camper might be able to learn where the fish lurk and how they migrate. He would then need to select a strategic point to build the trap. He must discover what bark or branches to use for lashings. He must know how to make it substantial to withstand tide or current. He must decide how to get the fish out of the trap. He must know the legal relations and the whys. As no pictures were taken in the good old days, photography would be in order. In fact the aim of the whole project might be to get a moving picture of the way the X tribe of Indians fished in Lake No-Name.

Another thing that links up with anticipation and fishing handicraft is the fish pole. Some camp leaders may insist on having their fish poles from a wood grown on a South Sea island, or possibly a steel rod of many pieces, finely fitted. The country boy,—who can catch six fish while the leader is getting one,—will name the hickory, hornbeam, shadbush, or white ash as his choice, but as a last resort he knows that almost any hardwood will give good service. The leader's rod may cost fifty dollars, but the country boy's pole is harvested with a scout knife. And the same lad does not have to exhibit a certain fly, or method of casting, or white linen knickers, to negotiate with a plain, everyday bullhead. The counselor who ignores the country fish pole is unfortu-

EVERY CAMPER LOVES HIS LAKE

Off on a picnic up the lake with an outboard motor on the camp craft to add to the speed

nate. More romance and good stories have been caught with birch poles than steel rods. The barefoot fisherboy surpasses the professional fisherman in prose and poetry every time. Libraries are "so full of a number of things" concerning fisherboys—to borrow from Stevenson—that it would seem unnecessary to press the point that campers should be given the opportunity to carry on fishing country boy style. Only he who has spent hours up and down the creek or on the banks of the millpond can realize the joy afishin'. Yet in most camps about as much can be said of fishin' as of catching snakes in Ireland.

And every youthful Walton knows that angleworms will fulfil the physiology of the hook. The business end of the line is whirled around his head and flung out into the water. Then it may be necessary to sit and sit and sit before he gets a slight twitch on the line that indicates a message. Fishing has that alluring quality of quiet joy. But for a counselor to come along and say, "Johnny, you must hold the rod in the right hand, reel down, thumb along the dorsal side, the elbow against the side, the rod at an angle of 45 degrees, and above all things be sure to use only the forearm and wrist in casting"; and so on ad infinitum, would sound just natural and schooly enough to make Johnny delegate fishing to the archives of grammar and algebraic formulae. Yet just as soon as a fishing counselor arrives we surmise,—from having dealt often with Nature counselors,—that the above would happen.

Here is another example of a contrast in the attitude of two camp directors toward fishing. Director A said: "No, we do not allow our boys to go fishing. The idea of destroying or killing is wrong. There is too much destruction already. Fishing is simply compensation for the boy who is a misfit socially. The chances are that he would not be any good on a team. Social adjustment is a big thing. That is the trouble with most Nature leaders. They know Nature but they are not socially adjusted. The boy gets the idea that the Nature man is a freak. That is not the fault of Nature that men behave this way". Director B said: "Some of our boys go fishing and I wish that more did. Fishing is an instinct. The boy who does not obey the call of this impulse is just that much short of being a red-blooded boy. Nothing can be compared with it for teaching patience and resourcefulness and then again—in these days of being on the jump every minute—I believe that fishing has a distinct place in teaching relaxation".

After all that has been said about perfect Nature lore, conservation, and country boy fish-poles we are going to recommend, yes at the risk of being misunderstood, that tackle-making may be a valuable handicraft. To scout along the river-bank and find a feather; to catch an insect appreciated by a fish; to make an imitation of this insect that will pass the inspection of a fish—this puts a fellow on his own. If he carries his handicraft through to a successful conclusion—that of landing the fish—he has caught more than the fish. Besides real economy it gives a sense of real independence. It gives the secure feeling of being able to battle one's own in the wilderness. This we call the height of accomplishment.

Albert A. Hansen

ALBERT A. HANSEN *has been a frequent contributor to Nature Magazine and this is by way of a more complete introduction. He is now associated with the Purdue University Agricultural Experiment Station. He is a graduate of Pennsylvania State College, where for a time he doubled as botany instructor and football coach. During the war he acquired wings in the Naval Aviation Service. He knows all the weeds by their nicknames.*

The TRAGEDY of HINDOSTAN

A Modern Solution to an Ancient Mystery

by Albert A. Hansen

THE SIGNING of the treaty of Ghent during December, 1814, bringing to a close the War of 1812, followed shortly afterward by the cessation of hostilities with the Indians, caused a decided movement from the populous East to the fertile region now known as the Middle West. One of the converging points for the westward stream of pioneer migration was a beautiful spot on the White River in southern Indiana known as Hindostan Falls. Here the river was sufficiently shallow to permit wagons to ford it.

As a matter of course a supply store soon appeared at this point, and it was rapidly followed by other business establishments. Then came the inevitable mill of pioneer settlements, dwellings were constructed, town lots were laid out, and the bustling community was named Hindostan. Soon a county was carved out of the wilderness and the enterprising business men of the robust town of Hindostan pledged sufficient money to erect a court house, provision was made for the building of a jail and the erection of a public library and the thriving municipality became the seat of the young county. The community prospered and the happy, ambitious inhabitants became exceedingly proud of their handsome little city on the banks of the lovely White River, with its setting of unsurpassed natural beauty.

But the prosperity and happiness of the inhabitants was short lived. Grim tragedy stalked in their midst. First a strange malady destroyed grazing animals by the score. Shortly afterward a mysterious, fatal disease broke out among the people and the death toll became so heavy that the cemetery on the hill grew faster than the town in the river valley. The cause of the trouble was unknown and nothing could be done to check the ravages of disease since there was not even a resident physician in the unfortunate community. The angel of death took toll until the population dwindled almost to the vanishing point.

THE FATAL WHITE SNAKEROOT

Flowering top of the poisonous woodland plant that caused milk sickness and many pioneer deaths

The last act of this grim tragedy was a meeting of the survivors who agreed that since a mysterious and unknown poison had made the site of Hindostan unfit for human habitation, the town should be abandoned. Whereupon the remnants of what had been a thriving and prosperous community packed their goods and chattels, the mill was dismantled, and the seat of justice moved out of the treacherous valley to a more healthful lo-

cation on the summit of one of the river hills. Thus did an unkind fate sound the death knell of a thriving community in the prime of its youth.

Today about all that remains of the town of Hindostan are a few foundation stones that mark the site of the old mill that was formerly the center of life of the town. The glittering falls in the river, the beautiful bluffs and the richly-wooded ravines along the shore remain unchanged, but no community has since dared establish itself in this charming setting.

HINDOSTAN FALLS, MARTIN COUNTY, INDIANA

It was by these beautiful falls that the community was located before tragedy stalked in

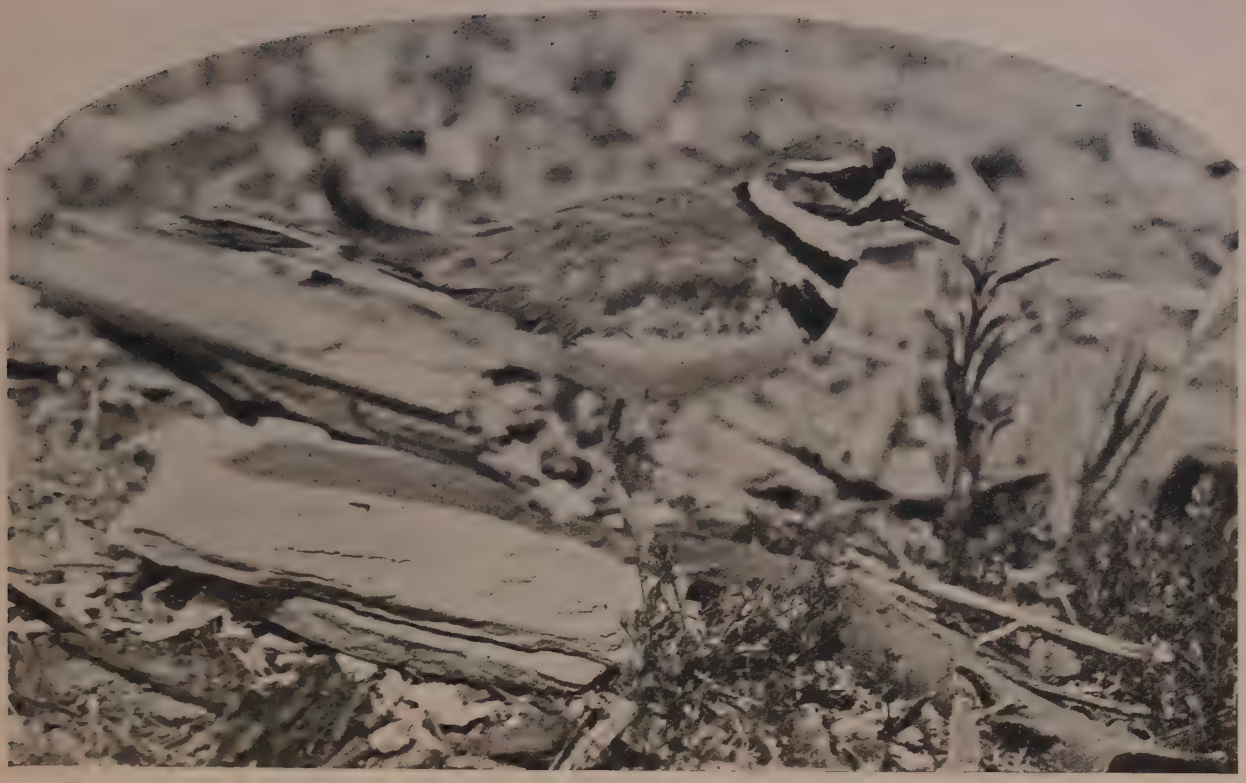
What was the mysterious malady that decimated this promising pioneer settlement? Since no medical records or other printed accounts describing the symptoms of the disease have been handed down to the present generation, we are forced to rely on tradition, and local tradition relates quite positively that the pestilence was milk sickness, an endemic disease that was prevalent among the early settlers and the cause of which was unknown. Milk sickness, said to have caused the death of Abraham Lincoln's mother, was a pioneer scourge that is reputed to have wiped out entire families and communities, particularly in the forested parts of the Ohio River valley states, Tennessee and North Carolina. Indeed, so disastrous were the ravages of this disease that a number of states offered rewards for a solution to the baffling mystery. As the forests were cleared and the land cultivated, the trouble gradually diminished but has never disappeared, as a number of recent deaths attributed to milk sickness in Indiana and Illinois will testify.

The cause of milk sickness has remained a mystery until recently. Under modern experiment station methods it has been demonstrated that a common woodland plant known as white snakeroot is capable of causing a fatal disease of cattle, sheep and horses. This malady is known as trembles. It has also been shown that the poison enters milk and is readily transmitted by this means. Futhermore, a great deal of evidence has accumulated that points definitely to white snakeroot as the cause of human milk sickness, that results from the use of butter, milk and other dairy products from animals that have been allowed to graze on the deadly plant. There is little doubt that milk sickness, the bane of the early settlers in the Middle West, can be traced directly to the poisonous effect of white snakeroot.

If milk sickness was the cause of the tragic end of the community of Hindostan, why shouldn't the plant persist to the present day? In order to be dangerous, white snakeroot must exist in fair abundance, since experimental work has shown that in general it requires from ten to twenty pounds of the plant to prove fatal to a cow or a horse, and there is evidence that milk sickness in the human is ordinarily contracted as a result of continually drinking the milk of cows that have grazed on quantities of the dangerous species. Furthermore, much of the land in the vicinity of the site of Hindostan has never been cleared or cultivated, existing now in almost the same condition as during the tragic days of the scourge. There is no reason why white snakeroot should not now be present in the region, providing tradition is correct in attributing the tragedy of Hindostan to milk sickness.

With this thought in mind, I made a pilgrimage to Hindostan Falls during early October to conduct a search for the dangerous plant. In company with the county agricultural agent, Jesse Wood of Shoals, Indiana, I drove to the site of the ill-fated community on the banks of the rippling White River. I have never seen a more beautiful spot. The falls are nearly a half mile wide and but a few feet high, stretching in a graceful curve from bank to bank. The natural splendor of the region is surpassed by few places in the Middle West and it was not strange that the early settlers were proud of their wonderful town site.

Although charmed by the natural beauty of our surroundings, we hastened to fulfill the object of our mission, the search for the white snakeroot. We did not have to hunt long for our quarry. There, growing profusely along the banks of the river, the glittering white blossoms conspicuous against the background of green foliage, was a luxuriant display of the dangerous death-dealing plant. Tradition, it seems, did not lie regarding the cause of the scourge of Hindostan. Thus has modern science pointed the way toward a probable solution of one of the great tragedies and mysteries of pioneer days.



WHAT HAPPENED TO THAT NEST?
The nest has been covered with a flat stone and the male bird is trying to figure out where it went to

THE KILLDEER

A Bird Who Demands Attention, and Gets It

by C. W. Leister

Photographs by the Author

One has to be very deaf to the call of Nature, if as he wanders afield he fails to notice the killdeer that is apparently trying his best to tell everyone that life, after all, is well worth living, and that he, for one, is perfectly willing to make a lot of noise about it. Dashing, noisy, friendly, equally well at home on salt-marsh, meadow or open field, wherever the vegetation is not too dense, the killdeer is one of our best known and most easily recognized birds.

His loud call,—"Killdee, Killdee, Killdee",—can be heard at almost any hour of the day or night, especially in the early morning and in the evening. Clear moonlight nights also inspire him to try out his voice. Possibly because he is heard so often, he is not without his own reputation as a weather prophet. My grandfather used to say, "Killdeer in the night, shepherds delight; Killdeer in the morning, shepherds take warning", thus referring to an old saying that has been used in many different ways. However, since we are taught that birds sing when they are happy and contented, and since the killdeer seems to be happy all the time, perhaps we should not put too much stock in this prophecy. At any rate, the killdeer does cause himself to be noticed.

During the migration season, and especially if they have been disturbed, killdeers are unusually noisy and noticeable. A flock of them will come wheeling and dashing through the air, uttering their shrill "Kee, Kee", drop suddenly to a sand-bar or point, where they will rest a moment or run rapidly along the shore. Then, just as abruptly, and as with one movement, all will take to the air again.

During the fall migration season they suffer a great deal from gunners, so much so, that in many localities the number killed in past years has been so great as to cause them to be very scarce and, in some instances, non-existent. They are also frequently shot, not for food, but because, when alarmed, their cries frighten away other game birds. However, the laws now protect them everywhere, and justly so, since their flesh is not of great value for food, and also because there is no doubt but that the killdeer's food habits make him an especially desirable bird. The food consists of grasshoppers, weevils, beetles, other destructive insects and worms, which, together, cost the farmer millions of dollars annually.

With the advent of the breeding season the killdeer does not go to a great deal of trouble in building the nest. A slight depression is hollowed out in the ground, among pebbles, bits of wood or shell, and here are laid the eggs. As a rule they are four in number. They are of a creamy-buff ground color, thickly blotched, streaked and marked with blackish. One end is much larger than

KILLDEER RETURNS TO THE NEST

The breast feathers are lowered so that the eggs may come in direct contact with the warm breast

the other, making the egg somewhat pear-shaped. I shall never forget how this rather peculiar shape surprised me, when, as a boy on the farm, I discovered my first killdeer's nest. I knew the eggs of most of the other birds nesting on the farm, but those of the killdeer were so radically different from any I had seen before that I shall always remember them. They offer a very good example of protective coloration, the colors blending extremely well with their surroundings. If one wants to pick upon a difficult task, try to point out the nest and eggs to some other person who has not previously seen them. Even while I was photographing them and knew their exact location, they would now and then blend so perfectly with the background as to lose their form and substance, and momentarily disappear from view. Another interesting fact that also holds true with many of the other shore-birds is that the eggs are always placed in the nest with the smaller ends together in the center. If this arrangement was disturbed while photographing the nest, a subsequent visit always found them in the original position. Just why this arrangement is insisted upon by the adults, it is difficult to say, unless the eggs are more easily kept warm while in that position.

Most persons who are interested in birds know that in the nesting season the breast of the adult is richly supplied with blood, so that while incubating the body temperature is more easily transmitted to the eggs. In fact, in certain species, this condition is so exaggerated that the bird possesses what are known as "brood spots". While photographing the killdeer, I noticed that the feathers covering her breast were always lowered just before she covered the eggs, thus bringing the latter in direct contact with her warm body.

KILLDEER'S NEST AND EGGS

The eggs offer a good example of protective coloration with streaks and spots that merge with the background

The brooding killdeer is an expert at leading the uninitiated away from her nest. If she sees the person approaching, her first impulse is to steal away just as rapidly and as quietly as possible. If she is surprised, however, she flutters from the nest, with wings helplessly beating the ground, making her way along as if each terrible effort would be her last. She is screaming all the while. Thus she will

continue, so long as there seems to be any chance of the intruder following her. When she has led him some distance from the nest, her wings miraculously regain their power and carry her into the air, leaving a rather befuddled and discomfited individual to realize his mistake.

The downy young are not fed for a time and brooded in the nest, as is the case with most of our other birds, but they are able to run about and take care of themselves soon after they are hatched. They are extremely adept at hiding in slight depressions in the earth or by pebbles, where their colors and markings blend perfectly with the background and thus they are enabled to escape the vicissitudes of killdeer babyhood.

THE HOBGOBLIN BEETLE

by Edward Step

THE ENORMOUS family of beetles in their world-wide range includes a large number of forms which either from their brilliant coloration, graceful or grotesque shapes, or their impersonation of other insects, make great departures from the prevailing idea of what a beetle should be like. It is certain that few persons, seeing for the first time the singular creature to which we have ventured upon giving an English name, would be rash enough to say off-hand to which group of insects it belongs. Our name, the hobgoblin, is justified by the fact that it is a mere translation of the Greek *Mormolyce*, which is its title in all the scientific records. We might add that we have heard it referred to jocularly as the banjo-beetle, in allusion to its general form, the long antennae being regarded as the strings that have gotten loose.

THE HOBGOBLIN OR BANJO BEETLE
An interesting insect resident of Malaya about whose life habits comparatively little is known

The remarkable banjo-like appearance is due chiefly to abnormal developments of the horny wing-covers or elytra, and to the fore-body and head being drawn out to quite unusual length, the latter, indeed, having a long neck, which is rarely seen in beetles. Although the insect is very expansive, it has little thickness. This has evident relation to its mode of life about the bark of trees, with which its blackish-brown coloration harmonizes. Also the peculiar chasing of the side expansions agrees with the surface texture of bark, a peculiarity probably advantageous to the insect.

Very little is known concerning the habits of this beetle, most of the specimens seen in museums and private collections having been obtained by collectors, who are, as a rule, too busy to spend time in observing the ways of the creatures they collect. From the little that is recorded, combined with the form of the beetle and the known relationship of the insect, it is not difficult to arrive at a general estimate of its mode of life. Its nearest kin in this country are the ground-beetles and tiger-beetles, active creatures that prey upon other insects; and though the weak, long limbs and expanded form of the hobgoblin will not allow us to credit it with great activity, its long, flat head and neck clearly enable it to search out insects that are sheltering under loose bark, whose presence is first ascertained probably by the insertion of the very long antennae.

The early life of the hobgoblin, before it attains the adult stage, is rather peculiar. The larva lives in one of the great fungus brackets that adorn unhealthy forest trees. The female beetle lays her eggs in or on the under surface of one of these brackets, and hatching on these the small grub begins to burrow into the substance of the fungus. Here it excavates an oval cell, small at first, but enlarged from time to time to afford space for its growing body. Into this chamber walk inquisitive insects who are always on the lookout for suitable retreats in which to spend their resting hours. Upon these visitors the grub feeds for a period of eight or nine months, when it will have reached its full size after casting its outgrown skins five times. The next shift reveals it as the pupa, with the general plan of the beetle indicated, but the several parts packed closely and without freedom of movement. In this stage it lies quiescent for another two or three months, then throws off its wraps and emerges in a pale, flabby and still cramped condition to the outer air and light, where antennae, neck, legs and side adornments reach full expansion and firmness, and they acquire the color of their surroundings.

It is to be hoped that some naturalist, exploring in Malaya, may find time to make observations on the everyday life of this remarkable insect, and tell us among other things what use is served by the great expansions of the wing-covers apart from their resemblance to surroundings. What is their value in flight? Are they encumbrances, or do they serve as planes and so reduce muscular effort in gliding through the air?

HINTS AND HELPS FOR *HOME and GARDEN*

JUNE

by

Thomas Sheward

CUTTINGS of geraniums are taken this month, for flowering next winter. When rooted, they should be firmly potted, and all buds cut away as soon as they form. In September they are taken indoors for flowering. Treated this way they should flower all winter, the double scarlet and red varieties being very useful at Christmas.

* * *

Standard tree fuchsias are very interesting for the window garden, and can be trained from cuttings, which root easily in June, if taken from the young wood. The young plants are grown to a single stem, and topped at the desired height, as illustrated, side shoots being cut away as indicated in illustration. A well shaped top is secured by pinching back the new shoots at six leaves.

* * *

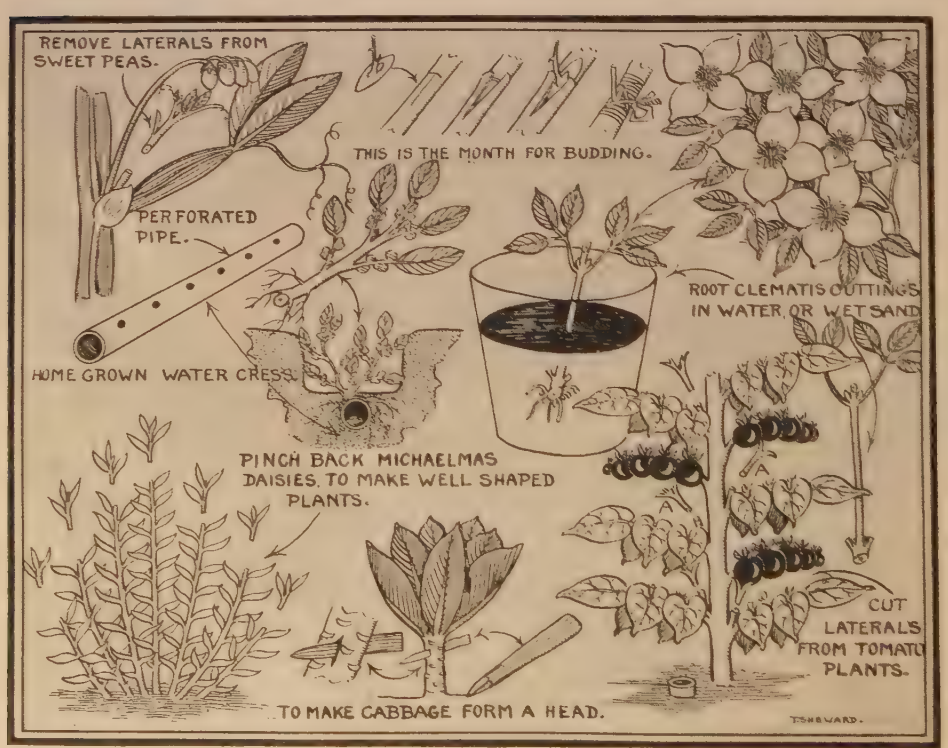
The Regal Lilies can easily be grown from seed, which should be sown in boxes early this month. These are placed in a sheltered situation in the garden, and should flower the second year from seed. It is a good plan to allow the seedlings to remain in the boxes for the first year without transplanting, as they can then easily be protected during the winter. "E" shows a box of lilium seedlings the first year, and "B" a year old bulb that will flower during the following summer. Nearly all the liliums can be grown from seed with very little trouble and many choice sorts can often be secured this way. Good varieties to sow now would be the Sulphur Gale hybrids, and the Martagon hybrids. Lilies are propagated commercially by scales, which are planted in boxes of sand, these forming small bulbs at the base, as shown in "D".

* * *

Delphiniums can be sown outside this month, in boxes or in drills. As a protection against slugs the seed boxes should be covered with cheese-cloth or with mosquito netting tacked down. Seedlings sown now should flower in September, and make strong plants for next year.

* * *

Columbine or *Aquilegia* if sown this month out-of-doors, will make good flowering plants in another year. The long-spurred hybrids give a great variety of color, and are very useful for cutting. Two good sorts for the rock garden are *Aquilegia alpina,* and *A. glandulosa,* which is the Siberian columbine with pale blue and white flowers, and which grows to be about one foot high. *A. helenae* is a hybrid of *A. glandulosa,* and much easier to grow from seed. For the wild garden there are several good species,—*A. caerulea,* the Rocky Mountain columbine, blue; *A. canadensis,* red and yellow; *A. chrysantha,* yellow; *A. flabellata,* white; and *A. skinneri,* crimson and red. Seed should be sown in boxes and the soil pressed firmly to insure quick germination.


REMOVE LATERALS FROM SWEET PEAS.
THIS IS THE MONTH FOR BUDDING.
PERFORATED PIPE.
ROOT CLEMATIS CUTTINGS IN WATER OR WET SAND
HOME GROWN WATER CRESS.
PINCH BACK MICHAELMAS DAISIES TO MAKE WELL SHAPED PLANTS.
CUT LATERALS FROM TOMATO PLANTS.
TO MAKE CABBAGE FORM A HEAD.
T. SHEWARD.

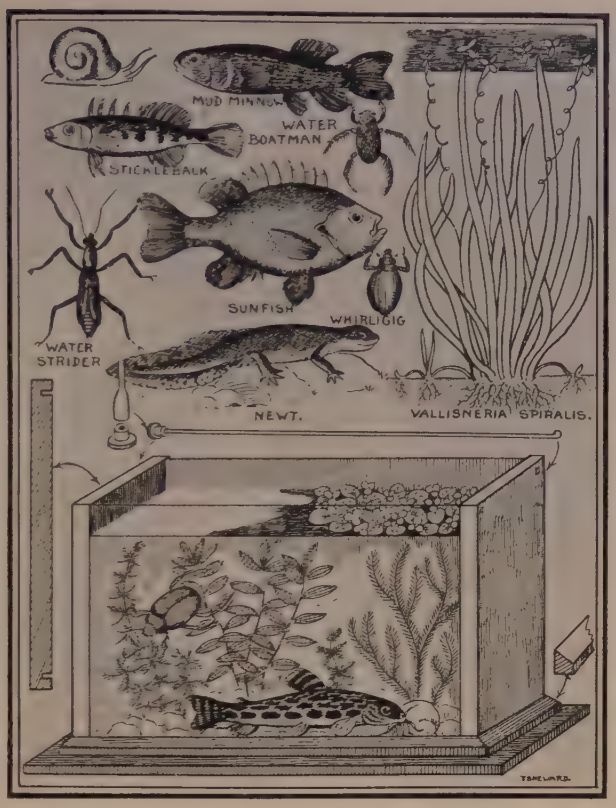
* * *

June is the month when the German Iris are in bloom, and if you are not already acquainted with the modern varieties of this popular flower, try to see a good collection this month. They give abundance of flowers for cutting, and grow in almost any situation. Some of the best standard sorts are,—Ambassadeur, Asia, Balboa, Col. Candelot, Corrida, Crusader, Dominion, Dream, Lent A. Williamson, Mamie, Lord of June, Magnifica, and Souvenir de Madam Gaudichau. Aphrodite is the best pink iris.

* * *

Growing ferns in the

house is a very interesting hobby. A good way to do this is to make a miniature rockery in a seed pan or large dish, as shown in the illustration. Pieces of rock are cemented to the bottom of the pan, and ferns planted in the crevices between them. In filling the rockery, peat is used, also moss, which also serves to cover the soil, drain it and to prevent evaporation. Green moss with small ferns already growing in it is best. Growing hardy ferns from spores is also very interesting, especially if you have a suitable place in the garden to make a fern dell, or hardy fern garden. This should be constructed in the shade, and is made of roots of trees and pieces of rock, like a rockery. A suitable soil is composed of leaf mould and peat, and fills the pockets. The diagram shows how spores are grown out of doors under a bell glass. A large pot is filled with moss, placed in a pan of water, and the spores are sown on the sides and top of the pot. When covered with a bell glass it is quite air tight. The moss draws up the water, so that the pot is always damp. In about two months the sides and top of the pot will be covered with small ferns, and when large enough they are transplanted into boxes, and grown in a shady place till ready for planting in the fern dell.



* * *

Budding is practiced this month. The illustration shows shield budding, used in propagating roses and fruit trees.

* * *

Roses can be rooted in a glass of water in the window this month, also clematis and many other plants.

* * *

Early cabbage often makes a lot of leaves without forming a head. A good way to remedy this is to cut through the stem with a sharp knife, then drive a wooden wedge in to keep the cut open, as illustrated.

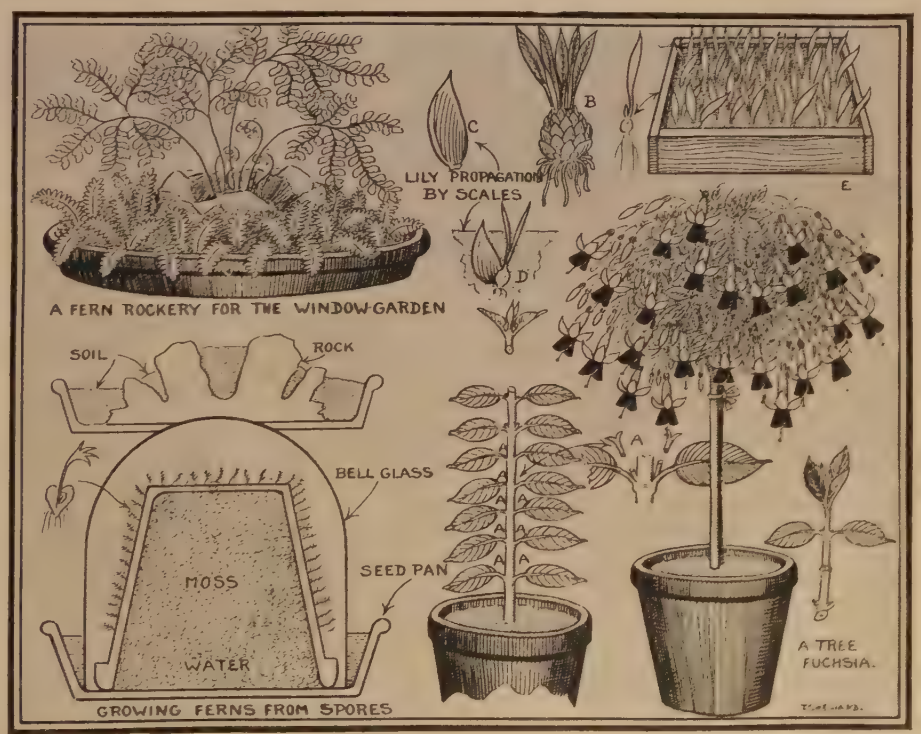
* * *

If you wish to grow water cress in the garden this summer, dig a trench six inches deep, and bury a perforated iron pipe four inches below the surface, as shown in the illustration. Water cress will root easily from cuttings, or can be grown from seed. The young plants are placed in the trench, and sub-irrigated from the garden tap. The idea is to allow the water to trickle slowly through the pipe, so that the soil will always be moist. Old garden hose that has been discarded may be used instead of iron pipe, if holes are made in the rubber with a heated piece of wire. Another way is to use a barrel and grow cress in the same way strawberries are sometimes grown. Two inch holes are made in the sides of the barrel about six inches apart; then it is filled with rich soil, and the cress is planted in it around the sides of the barrel. The soil is kept moist with the garden hose.

* * *

To get best results from sweet peas grow to a single stem by cutting out the side laterals, as shown in the illustration. This is how prize flowers are grown. Tomato plants should be treated in the same manner for fine fruit.

* * *



SPRUCE—A SOURCE OF RAYON

From such forests as this the fabric is obtained for transformation by one process

RAYON—FABRIC OF THE FOREST

Newcomer among Cloths Is also Little Sister to the Silk-worm

By Ethel I. Mason

WHEN Marco Polo made a voyage to China in the thirteenth century, he paid a visit to the palace of the Great Khan at Pekin. The walls were hung with yellow cat and the floors laid with soft black sables, but it was the wealth of silks and satins carried back to Europe that lured so many later caravans and argosies to the treasuries of the Far East.

Silk had always been the distinguishing mark of royalty and power, as well as of riches, though many of the nobility of ancient Greece and Rome preferred the fine linens for whose purple dye the hardy Phoenician mariners had braved the coasts of northern Africa, with subsequent voyagings into the uncharted seas that swept their ships toward Britain.

The ancients had early learned the art of weaving the long stems of dried reeds and grasses that later were discarded for the warmer wool, whose strands were woven in crude fashion for the first cloth. The discovery of the flower of the Gossypium or cotton plant was somewhat lost in the mists of antiquity of thirty-five hundred years ago. A bright lad of East India first learned the secret of pulling out and twisting the threads of long staple cotton.

The sampans of the teeming water ways of old China had carried mulberry leaves for the voracious silk-worm for upwards of five thousand years, since a Royal Queen had guided the culture of the silkworm in the days of Fu-Hi, when the precious fiber was given the name that after various lingual changes became "silk."

Thus the four textiles of wool and silk, cotton and linen had come down through the centuries practically unchanged in their usefulness in clothing civilization, and only in the last sixty years was there a discovery of new material we now know as a fabric named "rayon", dear under several names to feminine hearts.

The first possibility of such a discovery was hinted

MILADY DRESSED IN RAYON

This costume is indeed a far cry from the forest where it may have originated

at in 1734 by a noted French scientist, Reaumur, who suggested in his volume on insects that the drawing of threads might be possible from the gums and resins that were used in the making of Chinese varnish. One hundred and twenty years had elapsed, however, before Andemars of Lausanne took out a patent on the idea of making a collodion of young mulberry twigs and mixing them in a solution of ether and rubber, from which he drew a thread with a steel point and spun it in the usual way.

Other experimenters tried mixtures of glue, starch and resins which they attempted to spin like glass, but it was not until the close of the Nineteenth Century when Joseph Swan of England produced filaments for use in incandescent lamps that the essential steps of a new fabric were definitely foreshadowed.

Six years later, in 1889, Count Hilaire de Chardonnet, a young French nobleman, received the Grand Prix at the Paris Exposition for the discovery of a new textile he named "artificial silk" because it was produced from the branches and leaves of the mulberry tree. Chardonnet's invention was not the synthetic silk for which he had originally searched. It was a brand new textile that had been evolved from his study of the secret of the chemistry performed by those tiny magicians, the silk-worms, in transforming green mulberry leaves into the lustrous gossamer called silk.

After the earlier experiments, Chardonnet substituted cotton for the original wood pulp, as the latter requires extreme care in point of cleanliness and is incidentally somewhat more expensive. Factories sprang up at Tubize, Belgium, and in France for the manufacture of this new "artificial silk", as it is still largely known throughout Europe, and it was not until some four years before the opening of the World War that the fabric became popular in America.

Whatever may have been thought of the new textile in its infancy, during the post-war period it became a lusty youngster, and by 1923 had outstripped its older sister, thread silk, by more than ten million pounds. To-day it is considered one of the brightest stars of the textiles, among which it ranks third place.

One interesting feature of rayon is that it is very nearly water-repellent, and not only dries more quickly than any other textile, but can accomplish this result from sopping wet to bone dry in twenty minutes. The big electrical companies are now working on rayon in their laboratories as it is thought that it may be insulated against electricity, though curiously enough, one of the earliest complaints against the material was this same property of insulation which now may be harnessed for the use of engineers.

Of course the real reason for the success of rayon is that science has put what appears to be silk, long known as a fabric worn by kings, within the reach of a multitude of purses. Moreover, it is a material that

combines well with the older members of the fabric family, and this affords the designer new ideas and new fields to conquer, with interesting combinations of worsted, spun silk and cotton.

Spiders are said to "spin their webs", but this is not technically correct, and in much the same fashion it is not correct to speak of "spinning" rayon, which is really pressed or drawn from a nozzle in long threads and sometimes twisted on a bobbin or into a "cheese" without being broken.

The big difference between rayon and other fabrics is its weakness. Size for size, rayon has only twenty-five to forty per cent of the tensile strength of silk, and only forty to fifty-five per cent of that of Egyptian cotton. Individual threads of rayon make a better showing under strain, but it is a third to two-thirds weaker when wet than when dry, and it is this factor that the buying public did not at first understand or allow for when the fabric was placed on the market.

Spruce is used for the cellulose if wood pulp is required, and cotton linters, or the short fibers remaining on the cotton seed after ginning, for other methods. The four chief processes in commercial use are the nitro-cellulose; the cupro-ammonium; the viscose, and the cellulose acetate, though chemists are thinking and experimenting with future possibilities that may lessen the work or afford simpler methods not yet discovered.

If wood pulp is utilized, the logs are felled and piled on the banks of the forest rivers until high water, when they are floated down to the pulp mill near the mouth of the stream.

The logs are then stripped of their bark, broken into small chips and boiled under pressure with chemicals. This removes the gums and resins, and the solution is then washed out and bleached, and pressed into sheets about the size and consistency of blotting paper. These large sheets are cut up and placed in caustic soda for a day, when the liquid is forced out and the sheets torn into particles that are placed in containers at an even temperature for twenty-four hours.

The mass is now known as alkali cellulose and is placed in a churn with carbon bisulphide and slowly revolved to form the cellulose xanthate, a plastic substance that is light in color and readily dissolves in water. The substance is placed with caustic soda in a machine that beats and mixes it in a uniform mass, and is the final process in converting the cellulose to the liquid form called "viscose", when that process is used. This resembles molasses in color and stickiness.

This viscose is aged by standing in large vats at an even temperature and is then carefully filtered before removal to the spinning room. The secret of forming the filaments of the threads is that the viscose solution is strong alkaline and hardens on coming in contact with the acid, and the cellulose reverts to a solid form. The viscose is forced through a plate with holes so tiny that they are practically invisible, and this stage of the process is the nearest that the new textile comes to being "spun". The silkworm's work has been duplicated.

ALL THESE ARE PRODUCTS OF RAYON

They include paper bagging, wrapping twine, imitation horsehair, linoleum, paper laths and,—even,—sausage casing

The thread as wound up is made of parallel fibers in a semi-gelatinous state. This is cleaned and dried and the fragile filaments are later grouped together and twisted on another spool and there you are with the first thread ever invented by man in all the centuries.

The results of rubbing of Aladdin's lamp were hardly less astonishing than the metamorphosis of wood pulp, worth perhaps ten cents a pound, into shimmering lengths of softest brocade or what even a clever silkworm might suppose to be silk. But though the fabric has been masquerading for some time past in a modest way as tassels on the lamp, or curtains at the window, or the sheen in velour draperies, the latest development in the constant improvements made by the various chemists enable rayon to rival its older brothers and sisters in their own field.

Wool is wearing stripes of rayon this winter, and plans to decorate worsted with it in the spring. Velvet is looking to its ancient laurels since the great designers abroad are offering costumes made of the new upstart, rather than of the ancient fabric. Silk has thrown off much of the tin used to weight it, as rayon seems to perform the same purpose with less or no danger to the precious fabric, while King Cotton is frankly playing around with rayon in every conceivable manner that a well-behaved fabric knows about. In fact, rayon is no longer treated like a cloth family step-child.

TEXAS PETS

They Hold Sunshine Levees in Peoria, Illinois

CHAMELEONS ALL
Meet Bull, Billie, Texas and Ma Ferguson, and watch their colors change

by George W. Smith

WE WERE standing there discussing them—the animal man of our town and myself.

"They're black", I said, "all four of them".

"You're color-blind; they're blue as a June sky", the animal man said.

One of them scurried into the light. We gasped,—the creature was green!

We watched the play of colors in our four small busybodies; something like the Aurora Borealis they were,—gray, blue, green, black, white and yellow,—and never quite the same twice.

"They ought to be politicians", the man observed.

They weren't; they were just Bull, Billie, Texas and Ma Ferguson, four little chameleons with three inches of body and seven inches of tail, and they had come all the way from the Lone Star State to grace our discussions and lend color to our home.

They all,—especially Ma Ferguson,—were ready to bite me when I first approached their cages, and they displayed a ferocious set of teeth. But in three days I could lead them on a string for a short promenade, and in two or three weeks they lost all sense of fear, running up and down my arm and perching quietly on my shoulder.

I quickly discovered the source of their many colors in thousands of little dots or markings whose color they can change at will. They do not seem to have any particular scheme for running through their array, but change in haphazard fashion, with startling results. The males have a beautiful shade of orange on the front of the neck, and black design on their several backs.

They seemed to like petting more than anything else in the world. They would pat on the glass of the cage to attract my attention, and when any other of our animals was getting attention, they insinuated themselves and demanded service. The question of food was the least of their worries, and it was only lately that I stopped the forced feeding of honey, and tried insects. To date they have eaten several grasshoppers, a bumble bee, some crickets, and one of them,—Ma Ferguson, again,—was persuaded to try a few flies—"very tasty".

Billie is the brightest of the quartette, and will climb a ladder, fireman fashion,—I have been trying to get him to wear his brightest coat when he does this,—and will jump from my hand to the shoulder of another person when ordered. The rest perch on their shelves in the cage, or do stunts on the trapeze, or lie in their bathing pool, just meditating.

I bedded them down last winter in finely cut paper, and kept plenty of clean sand in their cages, and although of a southern breed, they did not mind the Illinois cold. A little more quiet in winter, that was all.

Our town of Peoria is having a lot of excitement just now. The warm spring days have brought the four creatures out of doors, and led by Ma Ferguson, they visit in turn the bank, postoffice and the lawn of our courthouse. Here they hold a levee each pleasant afternoon, and Peoria business just naturally stops a bit.

DEPARTMENT *of*

NATURE EDUCATION

Dr. E. Laurence Palmer

Cornell University, Director

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A Matter of Judgment

by E. Laurence Palmer

TWO PEOPLE came into my office recently to make inquiries about the identification of a kind of bird that they had seen. Both were agreed that "the bird was one of a flock of its kind", that it "had a rather long bill", that it was "mostly black" and that it "had a funny bunch of calls". They could not agree as to whether the tail was relatively short, as to the color of the bill, as to whether the tail was square or rounded, as to how high in the tree the birds were, as to the length of the birds or as to the number in the flock.

Some of the details of value in assisting us in studying Nature make demands upon us for accurate observation. Others call upon judgment. We may observe with some degree of accuracy the coloration of birds but without judgment we cannot make a reasonable report as to the approximate length of some living bird high in a tree. Ability to do this is often valuable in assisting in the identification at a distance of many warblers, flycatchers and sparrows. It is also useful in the identification of flying hawks. Many a reported "eagle" is undoubtedly one of the larger hawks. If good judgment is an asset to bird lovers, it is more than valuable to that goodly proportion of Nature lovers who cherish a reputation for honesty and yet yearn for fame as fishermen. Ability to judge length, weight and number of the fish that escaped and to confine the reports on the same to the facts is a rare combination, scarcely found in the possession of fishermen.

Ability to judge size, color, weight and number is not the only skill useful to naturalists in the realm of judgment. A sense of direction is a valuable possession at the end of a long trip whether the trip has been for the purpose of catching fish, watching birds or just enjoying nature.

Since ability to judge that which is seen in Nature is so valuable, it might be well to consider a few ways by which we may improve ourselves.

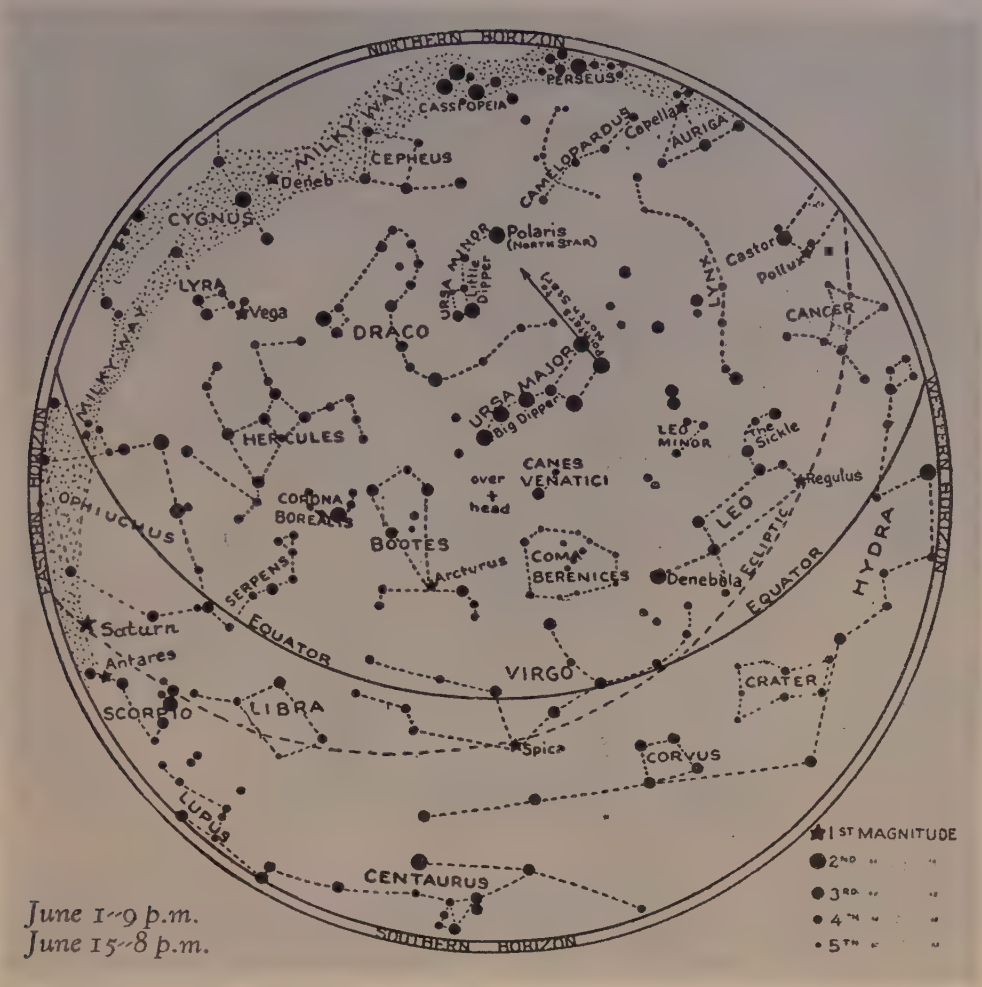
To determine which of four individuals may have the best ability to judge direction, place them so that each faces towards a different compass direction. Place a pebble or chalk-mark to represent a common starting point between them. Blind-fold them or ask them to keep their eyes closed and have them all take three steps forward. When this is done, ask them to turn to the right or left 90 degrees and take four steps. When this is done, tell them that they are just five steps from the place from which they started, or should be that distance if they have followed directions carefully. Ask them, one by one, to take the five steps which they think is towards their starting point and still blinded put a second pebble or chalk-mark where they think the first was. The one doing this best four times out of five tries is possibly the best in judgment of the sort with which we here are concerned. If this may be done out of doors, the number of steps taken may be greatly increased, providing the same proportion is maintained. If you are in a broken country where watercourses do not easily tell you where you are, this may be tried, allowing individuals to keep their eyes open and sending them off three hundred steps, then turning and going four hundred steps, and then returning to the starting point counting their steps. The individual who returns to the exact spot has good judgment.

Possibly by the time you have returned from a hike, there may be great difference of opinion as to the distance you have covered. If however, the members of a hiking party each pace off one hundred yards in rotation, a fair idea of distance may be obtained, for the estimates of those who over-judge will be approximately compensated for by those who underrate distances.

A fifty-foot tape, a compass and a spring scale should be a part of the equipment of those endeavoring to help themselves or others in the matter of judging things out-of-doors. One of the things about which judgment varies greatly is, how long is a minute. If you don't believe this is difficult, ask a group without watches to record such times as two, five or ten minutes in any way you see fit. This may help you be more truthful when you say, for example, "It took the ant three minutes to drag the beetle across the sidewalk". And at other times.

NATURE STUDY PROGRAM

At the meeting of the American Nature Study Society and the Science section of the National Education Association, which will take place in Minneapolis, Minnesota on the afternoon of July 2, the speakers will be Gilbert H. Trafton, of Mankato Normal School, Mankato, Minnesota, who will talk on "The Relative Importance of the Biological and Physical Phases of Science in the Elementary School"; Mildred L. Hoeer, New York, whose subject is "The Coordinating Council on Nature Activities"; Theodosia Hadley, president of the National Council Supervisors of Nature Study and Gardening, Kalamazoo, Michigan, discussing "The Larger Aspect of Nature Study"; and Jennie Hall, supervisor of Nature study in Minneapolis, who will address the meeting on "Science in the Elementary Schools of Minneapolis."



TO USE HOLD OVER THE HEAD WITH TOP TOWARD THE NORTH

COMETS AND THE JUNE SKY

Strange Visitors That Have Called On Our Sun

by Isabel M. Lewis

SCARCELY a year passes by without the appearance of several comets. Many of these belong in the class of the short-period comets and they return repeatedly at intervals ranging from three and three-tenths years for Encke's comet to seventy-six years for Halley's comet, the largest and finest of these short-period comets. The returns of such comets can be predicted in advance with great accuracy. Encke's comet, which was discovered in 1818, has been observed at every return up to the present time. It was picked up at its thirty-sixth return last November by Dr. Van Biesbroeck with the great Yerkes refractor within less than one half of a minute of arc of its predicted position 124 days before its nearest approach to the sun on Feb. 20. Although this comet was originally discovered by Pons it was named after the astronomer Encke who devoted much time to the study of its orbit and showed that it was moving in an elliptical path with a period of only three and a third years. When nearest the sun it is within the orbit of Mercury and when most distant it is well inside the orbit of Jupiter. At its brightest it is a nebulous object (seen only through the telescope) and it is noted chiefly for the fact that it has the shortest period of any known comet. Considerable work has been done on the orbit of this comet and it has certain irregularities of motion that have led astronomers to believe that at some times it encounters a resisting medium which reduces the size of its orbit, and shortens its period. The same slowing down of motion by encounter with a resisting medium has been suspected in the case of the Pons-Winnecke comet, another short-period comet which returned to the sun last June.

An unusually large number of comets, ten in all, were observed last year. Four of these were returns of short period comets, but six were unexpected comets. The last of these to be discovered, called at first Comet K

1927 in accordance with the custom of identifying comets by the year of their appearance and a letter representing the order of their appearance that year, was later named Skjellerup's Comet, after the amateur astronomer of that name in Australia who first reported its discovery on Dec. 3. This comet was independently discovered by many in the southern hemisphere as it was plainly visible to the naked eye, but it was in general a disappointing object when it came into view in the northern heavens Christmas week. At the Lowell Observatory it was, indeed, visible to the naked eye easily even in broad daylight on Dec. 19, and was photographed there in mid-afternoon on Dec. 16 when only five degrees from the sun. This fact seems to show how far superior the atmospheric conditions in Arizona are to those in most other parts of the country. While the Flagstaff observers failed even to report their observations of the comet, supposing that all the world was observing it, the eastern observers were having difficulty in finding it without the aid of a telescope. Although this comet has been spoken of as the Great Comet of 1927 it hardly seems to deserve that name as it very rapidly faded from view after appearing in the northern sky, and was visible for only a very short period.

With the exception of Halley's periodic comet which returned to perihelion in 1910 and which is always a "Great" Comet since it is conspicuous to the naked eye, there has been no truly great or spectacular comet since the Great Comet of 1882. The "Great Comet" of the present century has yet to appear. In the nineteenth century six or more comets deserved this title. The comet of 1811 was one of the finest recorded in history. Its tail extended over an arc of twenty-five degrees and was fully one hundred million miles long. It would more than reach from the earth to the sun. Its central, star-like nucleus, in the head, the most brilliant part of a comet, was scarcely five hundred miles in diameter. It consisted probably of a swarm of meteoric masses intermingled with gases. The coma or head was five hundred thousand miles in diameter. The Great Comet of 1843 had an enormous tail, one hundred and fifty million miles long, and came within about fifty thousand miles of the sun. It was plainly visible in broad daylight close to the sun, a fact that added greatly to its interest.

YERKES OBSERVATORY

BORRELLY'S COMET

With a portion of the tail completely detached from the head. Thus do comets disintegrate and pass away

RAPIDLY PASSING

The Pon's-Winnecke Comet was less than four million miles away last June. The star trails show its speed

YERKES OBSERVATORY

Donati's Comet of 1858 was probably the most famous comet of the last century. First seen as a telescopic object by Donati at Florence in June it became visible to the naked eye in August and was at its greatest splendor in September and October. In the latter month the star Arcturus could be seen shining with undimmed splendor through the densest part of the tail, which showed how rare was the substance of which it was formed. It was found that Donati's Comet had a period of two thousand years and in the farthest part of its orbit would be five times more distant from the sun than the planet Neptune.

The Great Comets of 1880 and 1882 were the last of the truly spectacular comets to appear up to the present time. They were remarkable for the fact that they were members of a group or family of comets all traveling nearly in the same path around the sun and noted for their enormous size, great brilliancy and close approach to the sun. The comet of 1882 passed so close to the sun that it swept through the solar corona. It was subject to violent disruptive forces because of its close approach to the sun and was seen after perihelious passage to have as many as five separate nuclei and as many small comet-like masses close to the main body of the comet as if they had been torn from it.

All of these great and spectacular comets move in orbits of enormous size and extent and have periods that run into thousands and hundreds of thousands of years. They are not worn out and disintegrated into swarms of meteors by frequent returns to the sun as is the case with the small and inconspicuous short-period comets which are with

(Continued on page 401)

Speechless...When a Few Words Would Have Made Me!

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THE annual banquet of our Association—the biggest men in the industry present—and without a word of warning the Chairman called on me to speak—and my mind went blank!

I half rose from my seat, bowed awkwardly and mumbled, "I'm afraid you'll have to excuse me today," and dropped back in my chair.

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Always I had been a victim of paralyzing stage fright. Because of my timidity, my diffidence, I was just a nobody, with no knack of impressing others—of putting myself across. No matter how hard I worked it all went for nothing—I could never win the big positions, the important offices, simply because I was tongue-tied in public.

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How to train your memory
How to enlarge your vocabulary
How to overcome stage fright
How to develop self-confidence
How to acquire a winning personality
How to strengthen your will-power and ambition
How to become a clear, accurate thinker
How to develop your power of concentration
How to be the master of any situation

Today I am one of the biggest men in our industry. Scarcely a meeting or banquet is held without me being asked to speak. My real ability, which was hidden so long by stage fright, is now recognized by everyone. I am asked to conferences, luncheons and banquets as a popular after-dinner speaker. This amazing training has made me into a self-confident, aggressive talker—an easy, versatile conversationalist—almost over night.

* * *

No matter what work you are now doing nor what may be your station in life; no matter how timid and self-conscious you are when called upon to speak, you can quickly bring out your natural ability and become a powerful speaker. Now, through an amazing new training you can quickly shape yourself into an outstanding influential speaker able to dominate one man or five thousand.

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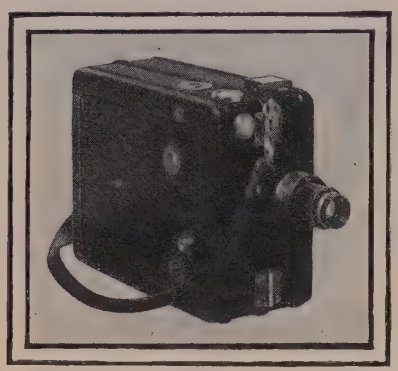
William Beebe Used a DeVry



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Photographic DEPARTMENT

L.W. Brownell, Editor

What is the best method of getting gloss on prints?—M.H.

The best method of obtaining a high gloss on prints is by the use of the ferrotype plate, which is a thin metal plate with a highly polished surface. Of course a high gloss can only be obtained on a glossy surface paper. The plates should always be washed before placing the prints on them but they need not be dried. In fact it is better that they should not be. The prints should be removed directly from the washing bath and placed upon the plates face downward. A piece of paper, newspaper will do, should then be placed over them and they should be squeegeed tightly to the plate with a flat squeegee. Care should be taken that all parts of each print is in close contact with the plate with no air bubbles between or else there will be dull spots on the surface of the prints. The ferrotype plates should be handled with care so that the surfaces may not become scratched or abraded in any way for any mark on the surface of the plate will show on the print. When the prints are thoroughly squeegeed the plates should be placed in a warm place (not hot) and allowed to dry. When absolutely dry the prints should peel off by themselves. When they begin to show a tendency to stick the plates should be treated with a solution of paraffin and benzine. This may be bought in solution from any photographic supply house or it can be made at home by dissolving ten grains of paraffin in one ounce of benzine or benzole. This should be rubbed all over the surface of the plates with absorbent cotton and the plates should then be thoroughly polished with a piece of soft flannel.

BROMIDE ENLARGEMENTS

Many photographers, especially among the Nature workers, prefer the use of small size plates, depending, to a large extent, upon enlargements rather than contact prints. This has many advantages, if one has the darkroom wherein to make these enlargements and a few words upon the making of them may not be amiss.

In the first place it must be remembered that bromide paper is infinitely faster than the fastest of the contact papers. Also, when the print has been properly exposed it builds up slowly in the developer, similar to a plate or film, gaining contrast as it develops. This quality can be taken advantage of in the case of a flat negative for, by a slight underexposure and prolonged development a print of sufficient contrast may be secured.

An overexposed negative, if the overexposure is not too great, may be saved by underdevelopment but the result will never be the snappy print that can be obtained by the correct exposure. It is well to remember that it is better to err on the side of under rather than over exposure if good contrast is desired. Of course if the negative is very hard and contrasty, a softened print

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may be obtained by giving a full time exposure.

Developer should be kept at about seventy degrees and a properly exposed print should be fully developed in from seventy to ninety seconds. Should greater contrast be desired the development may be continued for as much as three minutes without danger to the print.

To make a test of print quality cut a sheet of bromide paper into six strips. Judge what you think should be the correct exposure and give two of the strips that time, pinned across the image of your picture on the enlarging easel. Give two more half that time and the last two twice that time. Now develop one of each exposure in normal developer for one minute and the other set in the same developer for two minutes. If you have marked on the back of each strip the time of exposure and the time of development it will be easy to tell when they are dry, which exposure is nearest correct. Of the two strips in which the exposure is nearest correct, the one having the longer development will be found to have much the finer quality.

Correct exposure and properly full development will result in a print that will have all the brilliance, if not more, of a contact print. Over exposure and under development gives a flat print with no brilliance while under exposure and over development gives a print in which the contrast is too great

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Comets and the June Sky

(Continued from page 398)

few exceptions telescopic objects at all times even when closest to the sun. Many of them do not even possess tails, which seem to be the rightful heritage of all comets, but are merely faint nebulous patches.

Although by far the great majority of comets are telescopic objects, whether they are short-period or unexpected comets, it does not follow that such comets are uninteresting subjects. Many telescopic comets go through many varied, interesting and instructive changes, and astronomers have acquired most of their knowledge of the nature and behavior of comets from observations of the telescopic objects. One of the most interesting facts known about comets is that the curvature of the tail shows the nature of the gases of which it is composed. A long straight tail is composed of hydrogen gas, the ordinary slightly curved tail of hydrocarbon gases, and the short, stubby, greatly curved tail of metallic vapors. The tail is always directed away from the sun. This is an effect either of electrical repulsion between the sun and comet or else it is due to the fact that for very minute particles, such as form the tails of comets, the force of light pressure is greater than the attraction of gravitation and as a result these fine particles are driven off from the head of the comet to form the tail always in a direction away from the sun.

See Page 380 for Photographic Contest

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—Albert A. Hansen, Rutgers Univ. agri. Exp. Sta. in April, 1928, Nature Magazine

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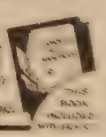

LaMOTTE SOIL TESTKIT

In this month of June there will be several interesting astronomical events. Chief of these will be the total eclipse of the moon on June 5, visible in the western part of the United States and Canada as well as in the western part of South America, the Pacific Ocean, Australia and the eastern part of Asia. The partial phase of the eclipse will begin at 4:18 a. m. Central Time; the total phase will begin at 5:31 a. m. and end at 6:48 a. m.; the partial phase will end at 8:02 a. m. So in most of the eastern and central part of the country the sun will rise and the moon will set before the eclipse begins. Part of the partial eclipse will be visible in some of the central states. In the western states the moon will set totally eclipsed at sunrise.

There is also a partial eclipse of the sun on June 17 visible only near the Arctic Circle in Eurasia. Its magnitude will be only four hundredths of the sun's diameter.

Summer will begin this month on June 21 at 11:07 a. m. when the sun will reach its farthest northern point in the constellation of Gemini. This will be the longest day of the year in the northern hemisphere. Mercury reaches its greatest eastern elongation on June 2 and should be visible for nearly a week at this time in the northwest immediately after sunset.

Saturn comes into opposition with the sun on June 6 and will then be visible throughout the night. It will be found in the constellation of Scorpio to the northeast of Antares.

Mars rises more than three hours before the sun and passes from Pisces into Aries this month. It is now equal to a star of the first magnitude in brightness and its brightness will steadily increase.

Swamp Flower Hunting

Among the interesting places where one can find rare and beautiful flowers, get wet to the heart's content, and have the excitement born of danger, Charles Penrose, aged twelve, of Marietta, Ohio, recommends any swamp, but particularly his swamp, where sundew, moccasin flower, Indian pipe and pitcher plant await investigation. He writes: "It is especially fine to hunt flowers in a swamp, for when you find a new one, you can overcome your excitement by falling into the water, as I do every time I go". He advises, however: "Unless you know your swamps, don't go near them"

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NATURE NEWS AND VIEWS

Better Gas Stations

William E. Frenaye, Jr. and Henry Ives Cobb, Jr., both of New York City, were the winners of the two $500 first prizes as a result of their drawings of sightly, rustic refreshment stands and gas stations in the second of the four Wayside Refreshment Stand Competitions, which have been initiated by Mrs. John D. Rockefeller, Jr. through the Art Center of New York and the American Civic Association, to devise ways of improving the appearance of the highways. Mr. Frenaye took first prize over Franklin Scott of New York City, Laurence Doubleday, of Ithaca, N. Y., James A. Brillon of Boston, Mass., and Burton A. Bugbee of Ithaca, N. Y., who were prize winners in the order named in the group competing for the best refreshment stands, while Mr. Cobb's creation of combination gas station and refreshment stand gained precedence over those submitted by Malcolm P. Cameron, Sam F. Swales, Weston M. Guety, and A. S. Crapsey and Charles Leonardi, all of New York City. Simplicity of design coupled with rustic charm characterized the best drawings.

Allegany Park School

The second annual summer session of the Allegany School of Natural History, in Allegany State Park, near Buffalo, N. Y. will begin July 7 under the direction of Dr. Robert E. Coker, professor of zoology at the University of North Carolina, and will extend until August 25. This school was created in 1927 by the New York State Museum of the University of the State of New York, the Buffalo Society of Natural Sciences, and the Allegany State Park Commission to meet a growing need for qualified teachers of natural history. Located in the midst of the sixty thousand acres of the Allegany Plateau, on the Allegany river, it presents opportunities for first hand study of flora and fauna, and offers as a faculty men who are recognized as experts in their field. The ideal of the school, according to Director Coker, is to give to every one who leaves it, "the ability to be self-educating, in the fields of his choice, and to stimulate him to become a source of information to others". Fifty students can be accommodated in the furnished cabins. Zoology, geology, nature study, field botany, and natural history of birds will be among the courses offered.

Cucumber Trees

The fact that the Large-Leaved Cucumber tree, whose thirty-inch leaves and big flowers gain universal attention, will grow as far north as Boston, Mass., has been disclosed by Robert Sparks Walker, of Chattanooga, Tenn., who writes concerning this hardy plant: "Even the man who has been asleep for decades awakes to ask about this tree". Two good specimens, he points out, exist on the plot of ground just in back of the White House in Washington. This tree was the subject of an article by Adele Seyle in March NATURE MAGAZINE.

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THE same soil and the same reasonable care that will give you ordinary flowers from ordinary bulbs, will give you superb and gorgeous flowers from Elliott bulbs. Why devote time and space to any but the finest?

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Order before July 1

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Clara Butt—Delicate salmon pink
Euterpe—Mauve-lavender. Extra fine
Farncombe Sanders—Fiery scarlet
Pride of Haarlem—Deep old rose
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Baronne de La Tonnaye—Vivid pink
Bronze Queen—Buff and golden bronze
Dream—Lovely delicate lilac
Faust—Velvety maroon-purple
Glow—Deep glowing vermilion

100 Bulbs $3.95 carriage prepaid

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Other Offers: (Collection B) 250 bulbs, $9; (Collection C) 1,000 bulbs, $35. We allow 5% discount for cash with order.

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Spray "Black Leaf 40" 40% NICOTINE

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Irises add Permanency

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Irises, most popular of all flowers, are easy to grow—most vigorous—adaptable to almost any garden plantings.

—Bearded Irises for your rock garden.
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Irises lend themselves just naturally to your well-planned garden—whether general arrangement, in a border with other perennials or in massed planting. They are colorful, and this is the age of color.

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All about Irises—How to plant an Iris garden—How to grow them. Many rare and valuable varieties. Special collection offers.

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Nature Lore School

The Nature Lore School, conducted under the auspices of the Coördinating Council of Nature Activities, with headquarters at 77th Street and Central Park West, New York City, will open its ninth annual two week session under the direction of Bertha Chapman Cady, executive secretary, on June 16 at Camp Andree, Briarcliff Manor, New York. The purpose of this school, according to school committee in charge, is to further the interest of Nature studies and to train leaders for Nature service, and the enrollment this year, as formerly, is expected to consist of teachers, summer camp counsellors and Nature students. Located in the heart of the Westchester hills within thirty miles of New York City, it offers good opportunity for first hand investigation, and for vigorous camp life. Among the courses offered during the 1928 session are special studies on Trees and Forestry, Plant Ecology, Arts, Crafts, Music, Bird Study, Stars, Indian Gardens and Insect Life, and programs include field trips, camp fires, canoeing and swimming. The faculty, which is composed of men and women who are specialists in their field, includes Jan T. Byhouwer, of Agricultural College, Holland; Laurie H. Cox, Professor of Forestry, Syracuse University; Clyde Fisher, of the Museum of Natural History, New York City; R. Bruce Horsfall, artist for the American Nature Association; Gertrude Cary, art director at William and Mary College; Mildred L. Hoerr, of the University of Chicago; Carra Horsfall, camp editor of Nature Magazine; and Fay Welch, director of Tanager Lodge and chairman of the Nature Lore School Committee.

Apples and Teeth

The general dictum,—"An apple a day keeps the doctor away,"—has been stretched to "an apple a meal will force dentists to steal" by Dr. Philip Welsh, D.D.S., of New York City, who concludes after considerable experimentation that the apple is one of the best dentifrices extant. After ten years of investigation on himself and others, he reports that the more natural a food, the cleaner are the teeth and likewise other parts of the digestive system. The acid fruits, and particularly the apple with its tough peel, act as mouth wash, gargle, toothpaste and tooth-stimulant. "Though the healing professions have adopted the use of fruits in the diet of the sick, they have not yet acquainted the well with its beneficial effects", Dr. Welsh writes. So buy your apples early, against the rush.

Garden Club Chart

The Garden Club of America, at 598 Madison Avenue, New York City, is issuing in four tone color process, mounted on linen, the Hyde Chart of twenty-five wild flowers which especially need the protection of the people in the northeastern part of the United States. The size is 44 by 28 inches, and suitable to hang on the wall. The retail price is $2.50. A series of these charts, which are done by Mrs. Clarence R. Hyde, are to be issued, the next dealing with showy flowers which may be picked.

The Texas Bluebonnet

When a few weeks ago a correspondent asked through our Query Department the scientific name of the bluebonnet, we failed to recall that this plant has been formally chosen as the State Flower of Texas, and turning to the books found that *Centaurea*, an important composite, planted commonly and perhaps better known as Bachelor's Buttons, is sometimes called bluebonnet. Publication of this note in the March number brought prompt responses from several Texans and others, calling our attention to the error. Curiously enough, several correspondents named plants other than *Lupinus* as properly entitled to be called bluebonnet. This illustrates the difficulty of identifying organisms from local names alone. However, we are satisfied that the name bluebonnet, in the southwest, generally means some sort of *Lupinus*, a genus of very widespread distribution in North America. The several species are generally known as Lupine, but also locally called Sundial and Compass plant. Our apologies are due the State Flower of the Lone Star State.

Butterfly Lovers—'shun!!

Neal Hennessy, of 621 West Second Street, Seymour, Indiana, is desirous of getting in touch with other butterfly collectors, particularly in Central America, the Gulf states and in the Pacific Northwest. Those who, like him, enjoy pleasant afternoons with net and flitting streaks of color are asked to communicate.

Burning the Southland

Asserting that the South is responsible for the yearly burning of nearly twenty million acres of forest and cut-over land, or four-fifths of the total forest-burning in the Nation, and carelessness, coupled with ignorance, is responsible, Col. Wm. B. Greeley, until May 1 chief of the Forest Service, United States Department of Agriculture, stated recently that individual responsibility must be established and fire prevention systems made effective. Woods burning, he points out, while it has the sanction of false tradition behind it, handicaps those who want to profit from their land, overruns new growth, and is "gnawing at the vitals of the South". Education, he claims, is the principal need.

Farming Fur-Bearers

Of the many animals whose furs may grace milady's person as she strolls up the blazing pavement on a hot summer day, only the fox, muskrat, the prolific rabbit and possibly the raccoon make good investments for the fur-farmer, the Biological Survey Bureau of the United States Department of Agriculture advises fur-farm novices. Fishers, martens and otters are disinclined to breed in captivity, while minks are expensive in feed, equipment and labor. The cost of fencing the beaver coupled with his relatively low birth rate, and the expense of food and care in the case of the skunk take the edge from the profits of raising these creatures. The Bureau also advises beginners that reports of fabulous profits with no effort bear investigation, as only untiring labor, diligence, care and intelligent treatment of the animals will make fur-raising pay.

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PACHYSANDRA thrives in any soil and is of wonderful benefit to the health of old trees by restoring natural forest soil conditions.

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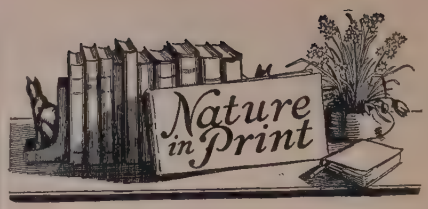

For Second-Graders

Most of the Nature texts have been designed for the higher school grades, and comparatively little has been provided the teacher of primary grades to assist her in Nature study with her classes. The publication of *Elementary Science by Grades* by D. Appleton and Company, therefore, meets an existing need. The series is edited by Dr. Frank W. Ballou, Superintendent of Schools of Washington, D. C., and the first of the series to be published,—that for the Second Grade,—is the combined work of Mrs. Elizabeth K. Peeples of the Washington Schools and Ellis C. Persing of the Cleveland School of Education.

Judging by this first volume in the series,—which is to cover grades one to six,—the publishers are intent upon making a really worthwhile contribution to Nature Study texts. Not only does the text give evidence of the most careful preparation and study of the needs of the particular school grade in question, but the book is delightfully illustrated. Few publishers have the courage or the foresight to undertake color work in the illustration of such texts. This series is an exception and Book Two includes several beautiful color plates by R. Bruce Horsfall. Needless to say these add notably to an excellent little school text. Book Two is listed at 72 cents and Book Three,—shortly forthcoming,—at 80 cents. Information relative to this series can be obtained from the Educational Department, D. Appleton and Company, 35 West 32nd St., New York.

* * *

On Trout Fishing

Trout fishermen rally around! Your book has been published. It bears the title of *The Evolution of Trout and Trout Fishing in America;* is written by Charles Zibeon Southard; is published by E. P. Dutton and Company, New York; and is listed at ten dollars. Mr. Southard's volume is a guide to the trout fisherman who wishes to know the habits and habitat of the trout and how to meet it. Space is devoted to the question of needed legislation for the preservation of trout, a detail which should give every fisherman concern. The book is beautifully printed and its cost is made what it is by the inclusion of nine color plates of different trout as well as maps of the eastern group of trout states and a map of Connecticut.

* * *

The Boston Terrier

One of the most popular of the native breeds of dogs has been the Boston terrier, and the new study on his habits, traits and good points, written by Vincent G. Perry, international judge, and published by the Judy Publishing Company, should appeal to both the dog fancier and the lover of dogs. *The Boston Terrier* discusses in a simple, practical manner the origin and history of the terrier, his development down to the present, his strains, and ways of breeding and caring for him.

"Poor Man's Orchids"

An increased interest in "poor man's orchids", or several varieties of iris, is predicted by Dr. David Griffiths, writing in circular No. 25-C, recently issued by the United States Department of Agriculture, who holds out to commercial growers promising fields in the variety known as *xiphium*, and urges them to try to develop unbroken varieties, improve the form and color, produce earlier varieties, and broaden the scope of the *tingitana* type, to make it more amenable to cultural and greenhouse handling. While the English group and *Iris tingitana* are restricted in their life range, the Dutch, Spanish, and *filifolia* types will grow as far south as the Carolinas, and thrive on the Pacific coast. Local growers are paying more attention to bulb growing, Dr. Griffiths points out, which will lessen the rate of foreign importation.

Caring For Trees

The tree owner, who every once in a while is sadly taken in by some self-styled "tree expert", and who seeks to find causes for his trees' rotting and dying, will welcome the little book by C. F. Greaves-Carpenter, tree scientist, which has recently been published by The MacMillan Company under the title of *The Care of Ornamental Trees*. It teaches how to distinguish between the work of a real college trained expert and a faker, how to cultivate, plant, prune, spray and fertilize. It lists the ailments of trees, and discusses ways of curing them—in short, it is a valuable handbook for estate owner, for superintendent, or for the owner of only a few trees.

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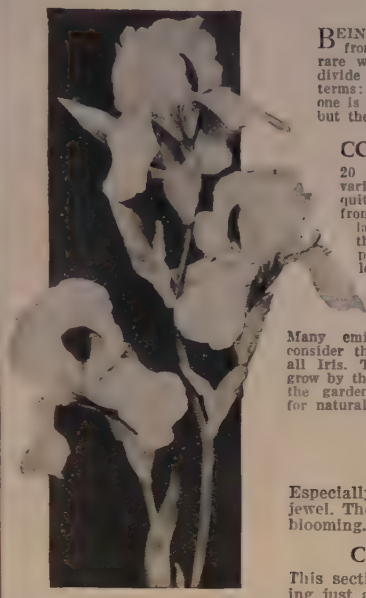

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* * *

Insect Biology

The insect world is always a fascinating one and its literature is varied. A notable addition to the titles is now made, however, by George H. Carpenter of the University of Manchester, in a volume entitled *The Biology of Insects.* While the text is written in technical fashion it is clearly presented and the volume should be an essential addition to scientific libraries. It is published by the Macmillan Company and is listed at $8.50.

* * *

Consider the Lily

Many people have felt that growing lilies in their gardens was a bit too much for them. Quite not so,—lilies can be grown well in most variations of the American climate and gradually are coming into renewed popularity. To this end *Garden Cinderellas* by Helen Morgenthau Fox should be of outstanding assistance to the amateur gardener. The author knows whereof she speaks and passes on the results of her own experience with these lovely and ancient flowers. The publishers are the Macmillan Company, New York and the book is listed at five dollars.

* * *

Nature Study

We are sorry to be late in giving notice to *Nature Study, Part II,* by Charles Lincoln Edwards, Director of Nature Study in the Los Angeles City Schools. The review copy was lost in transit to us, all of which has nothing to do with the fact that Dr. Edwards has now rounded out his Nature Study texts with this excellent addition to his first volume. This second book covers astronomy, the story of the earth, rocks and minerals, story of life, plants, seaside life, spiders, insects, fish, amphibia, reptiles, birds, mammals. American Indians and Eskimos. This volume supplements the subjects developed in the first volume. Dr. Edwards has prepared his book in interesting fashion textually, providing each chapter with practical exercises. Both volumes are published by the Hesperian Press of Los Angeles and can be obtained from this press or from Dr. Edwards himself.

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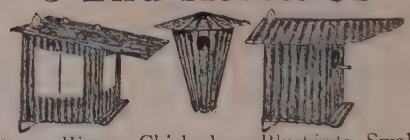

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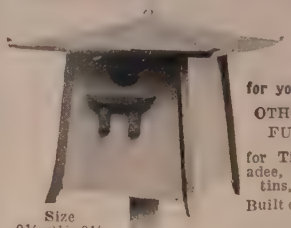

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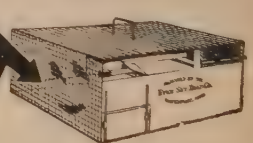

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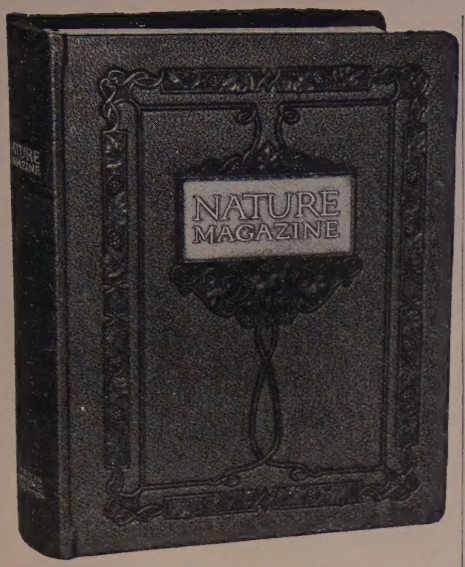

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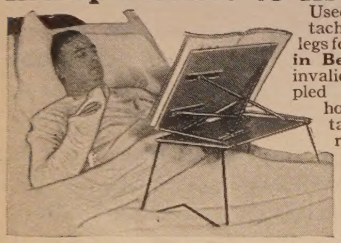

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Questions and Answers

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QUESTION: *There is a small bug living on our box-elder trees. It is one-half an inch long, blackish-brown on the wing with red edges around the front half, and a red line from its head about two-thirds of the way back, where it goes catacornered out to the sides. They are very numerous on the bark. What is their name?—P. S. N.*

ANSWER: It is almost certain from your description that these are the box-elder bugs, *Leptocoris trivittatus*. They seem to be indigenous in practically all the states west of the Mississippi, and have extended eastward through several states not originally occupied. In some places they have become a pest of fruit trees.

QUESTION: *Do the caterpillars of the Cecropia moth feed upon leaves of peach trees?—E. G.*

ANSWER: The Cecropia is such an omnivorous feeder that no one seems to have taken the trouble to list all its food plants. Some authors state that upwards of fifty different food plants are known, but do not list them. It is altogether probable, however, that the caterpillar would eat peach leaves.

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TREES *for a* BEAUTIFUL AMERICA

The Tree Planting Army Has Been Hard at Work All Spring Planting Them

FOR BEAUTY and for the future trees have been planted during the Spring months by the thousands, reports to the American Tree Association show. The Tree Planting Army has been gaining recruits in every section of the land. There will be a lull now until fall when the work will be resumed. Trees are being planted for many reasons; to beautify roads, as memorial settings and on a large scale for the future.

Beautification work along Connecticut highways continued with renewed vigor this year with the planting of trees along various roads as part of the program, according to plans of John A. MacDonald, State Highway Commissioner. In order to avoid unnatural growths, the trees to be planted will be typical New England growths, such as elm, sugar maple, pin oak, red maple, and white ash.

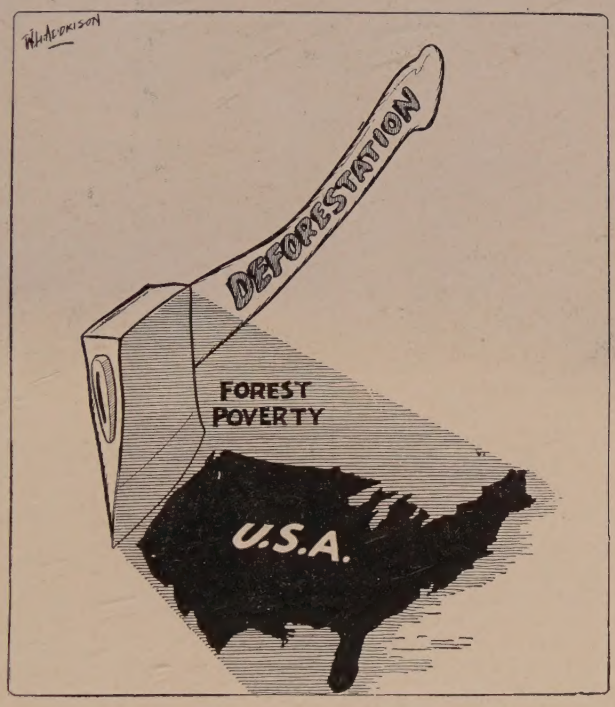
The Junior Project club of Cattaraugus county, N. Y. has planted 29,000 trees. The club was organized after Prof. James Davis, forester of Chautauqua county, gave an illustrated lecture on reforestation. The trees were planted under direction of Prof. Russell Young. The Randolph troops of Boy and Girl Scouts took part in the reforesting project, planting 14,000 trees.

Three hundred posts of the American Legion in California planted 50,000 trees during American Forest Week, according to State Commander Phil Dodson.

Otto H. Kahn selected a laurel for planting in the Forest of Fame at the California Botanic Garden in Mandeville canyon. He was the first man from outside California to be invited to add a tree to the forest, which includes trees from Oregon, Tennessee, Arizona and California. Charles B. Hopper, president of Metropolitan Trust Company and a director of the garden foundation, presented a miniature of the silver spade used in the ceremony to Kahn as a souvenir.

To continue the "Road of Friendly Trees" across Vashon Island, Campfire Girls of Seattle have planted the trees.

Beautification of Ozark highways by planting and preserving trees and conservation of wild flowers was approved by the Ozark Playground Association. Mrs. A. C. Hamilton, state chairman of conservation of Arkansas is behind the plan.



THE ECLIPSE

One of the prize-winning cartoons in the National Forestry Cartoon Contest of the American Tree Association

Girl Scouts of Topeka marked Arbor Day by planting trees. Mrs. I. D. Graham, merit badge examiner for the Girl Scouts on nature subjects, made the address Mrs. James Gray had charge of the plans.

More than a million trees were planted in Kansas Arbor Day, James Farley, secretary of the Kansas State Horticultural society, estimated. The Izaak Walton League, garden clubs and various civic organizations had been working to arouse the interest of citizens in observance of Arbor Day.

Otsego county N. Y. added 500 acres to its county forests this Spring. The reforesting committee of the board of supervisors placed with the Conservation Department an order of 130,000 white pine, 140,000 red pine, 30,000 Norway spruce, 50,000 balsam and 50,000 European larch. A year ago, Otsego county had only 73 acres in county forests.

The Edmonton, Alberta, Tree Planting Association has planted 15,000 trees during the past four years. The association has 50,000 young trees growing in a 10-acre tract, and thousands of these now require transplanting and cultivating.

Prospect of a town forest for Hagerstown, which may be the pioneer in a movement of this character in Maryland, are bright, according to Mrs. James Findlay, president of the Hagerstown Civic Club. The purposes of the forest will be to retain a bit of nature in its wild state and combine a recreational place for the citizens with the conservation of the resources of the community. It will also afford a sanctuary for birds. It is proposed to establish the forest along the Antietam Creek. Another feature will be the planting of memorial trees.

One hundred and fifty trees, donated by the Young Men's Business League for the grounds of the city schools, were planted by Boy Scouts of Beaumont, Texas. All scouts who plant trees will become members of the American Tree Association, Walter H. Gunn, scout executive said.

Plans to have every child in Kansas City plant some kind of tree or shrub in the planting season this year as a part of the city beautification program was arranged by the city beautification committee. It is estimated the city would have at least 30,000 pieces of foliage growing by the middle of summer.

Reproduction from a painting made on the estate of Mr. Alfred Prichard Stoan, Jr., Great Neck, L. I., by Frank Swift Chase

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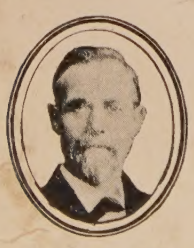

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